

R5-IN-Jean h. M.

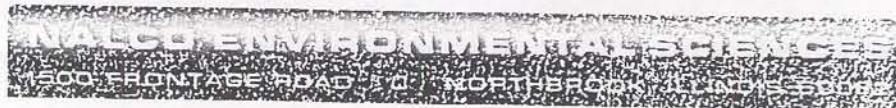


REPORT TO

NORTHERN INDIANA PUBLIC SERVICE COMPANY
HAMMOND, INDIANA

DEAN H. MITCHELL STATION
GARY, INDIANA

Archive
Tower





NALCO ENVIRONMENTAL SCIENCES

1500 FRONTAGE ROAD • NORTHBROOK, ILLINOIS 60062 • AREA 312-564-0700

NALCO CHEMICAL COMPANY

REPORT TO

NORTHERN INDIANA PUBLIC SERVICE COMPANY
HAMMOND, INDIANA

DEAN H. MITCHELL STATION
GARY, INDIANA

316 (b) DEMONSTRATION

PREPARED AND SUBMITTED
BY
NALCO ENVIRONMENTAL SCIENCES
5501-6788

Prepared by:

J. F. Krueger
J. F. Krueger, M.S.
Associate Biologist

Approved by:

J. A. Wilson
J. A. Wilson, M.S.
Project Coordinator

J. E. Hawley
J. E. Hawley, Ph.D.

Technical Manager

B. G. Johnson
B. G. Johnson, Ph.D.

General Manager

15 June 1976

NALCO ENVIRONMENTAL SCIENCES

TABLE OF CONTENTS

	<u>Page</u>
List of Figures	iii
List of Tables	vi
I. Summary and Conclusions	1
II. Introduction	
A. Objectives	5
B. Site Description	6
III. Materials and Methods	
A. Station Operations	12
B. Impingement	12
C. Egg and Larvae Entrainment	13
IV. Results and Discussion	
A. Station Operations	16
B. Impingement	18
C. Egg and Larvae Entrainment	47
V. References Cited	78
Appendix	
A. Operational Monitoring	A-1
B. Impingement Data	A-18
C. Entrainment Data	A-31

LIST OF FIGURES

<u>No.</u>	<u>Caption</u>	<u>Page</u>
1	Schematic of layout and location of Dean H. Mitchell Station	7
2	Schematic diagram of in-plant intake structures at Dean H. Mitchell Station	11
3	Monthly occurrence of Lake Michigan fish on the Dean H. Mitchell Station traveling screens, May 1975 through April 1976	19
4	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during May 1975	27
5	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during June 1975	28
6	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during July 1975	29
7	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during August 1975	30
8	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during October 1975	31
9	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during November 1975	32
10	Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during December 1975	33
11	Length frequency distribution of gizzard shad collected from the Dean H. Mitchell Station traveling screens during December 1975	35
12	Length frequency distribution of gizzard shad collected from the Dean H. Mitchell Station traveling screens during January 1976	36

NALCO ENVIRONMENTAL SCIENCES

LIST OF FIGURES (continued)

<u>No.</u>	<u>Caption</u>	<u>Page</u>
13	Length frequency distribution of yellow perch collected from the Dean H. Mitchell Station traveling screens during July 1975	38
14	Length frequency distribution of yellow perch collected from the Dean H. Mitchell Station traveling screens during August 1975	39
15	Mean daily density (number/m ³) of four species of Lake Michigan fish eggs collected by plankton net from the Dean H. Mitchell Station discharge canal, May through December 1975	49
16	Mean daily density (number/m ³) of three species of Lake Michigan fish larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, May through December 1975	50
17	Mean density (number/m ³) of rainbow smelt eggs collected by plankton net at various times of day from the discharge canal at Dean H. Mitchell Station during May 1975	51
18	Mean density (number/m ³) of rainbow smelt larvae collected by plankton net at various times of day from the discharge canal at Dean H. Mitchell Station, May through October 1975	54
19	Length frequency distribution of larval smelt collected by plankton net from the intake and discharge canals at Dean H. Mitchell Station during May and August 1975	56
20	Mean density (number/m ³) of alewife eggs collected by plankton net at various times of day from the discharge canal at Dean H. Mitchell Station, May through December 1975	58
21	Mean densities (number/m ³) of alewife eggs collected from the intake and discharge canals at Dean H. Mitchell Station, May-June 1975	60
22	Length frequency distribution of larval alewife collected by plankton net at Dean H. Mitchell Station, June 1975	63

NALCO ENVIRONMENTAL SCIENCES

LIST OF FIGURES (continued)

<u>No.</u>	<u>Caption</u>	<u>Page</u>
23	Length frequency distribution of larval alewife collected by plankton net at Dean H. Mitchell Station, July 1975	64
24	Length frequency distribution of larval alewife collected by plankton net at Dean H. Mitchell Station, August 1975	65
25	Mean density (number/m ³) of alewife larvae collected by plankton net at various times of day at Dean H. Mitchell Station, May through December 1975	67
26	Mean density (number/m ³) of carp eggs collected by plankton net at various times of day from discharge canal at Dean H. Mitchell Station, May through August 1975	70
27	Mean density (number/m ³) of carp larvae collected by plankton net at various times of day at Dean H. Mitchell Station, May through December 1975	72
28	Length frequency distribution of larval carp collected by plankton net at Dean H. Mitchell Station, May through July 1975	74

NALCO ENVIRONMENTAL SCIENCES

LIST OF TABLES

<u>No.</u>	<u>Title</u>	<u>Page</u>
1	Dean H. Mitchell Station units 4, 5, 6 and 11 design operational capacities (from data provided by Northern Indiana Public Service Company)	9
2	Monthly averages of operational parameters at Dean H. Mitchell Station from May 1975 through April 1976	17
3	Annual estimated total numbers and weight (Kg) of fish impinged on the traveling screens at Dean H. Mitchell Station from May 1975 through April 1976	21
4	Estimated monthly total numbers of fish impinged at Dean H. Mitchell Station, May 1975 through April 1976	22
5	Estimated monthly total weights (kg) of fish impinged at Dean H. Mitchell Station, May 1975 through April 1976	24
6	Total weight (kg) of fish impinged at Dean H. Mitchell Station during 1973 and 1974. (Data provided by Northern Indiana Public Service Company)	41
7	Commercial fish catch from Indiana portion of Lake Michigan	43
8	Estimated total number and weight of Lake Michigan fish impinged at Dean H. Mitchell Station, May 1975 through April 1976 and total Lake Michigan commercial production, sport landings and plantings in 1974	44
9	Peak collection periods of eggs and larvae for fish species at Dean H. Mitchell Station, May through December 1975	48
10	Estimated monthly total numbers of rainbow smelt (<i>Osmerus mordax</i>) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975	53
11	Estimated monthly total numbers of alewife (<i>Alosa</i> <i>pseudoharengus</i>) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975	61

LIST OF TABLES (continued)

<u>No.</u>	<u>Title</u>	<u>Page</u>
12	Estimated monthly total numbers of carp (<u>Cyprinus carpio</u>) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975	69
13	Estimated monthly total numbers of troutperch (<u>Percopsis omiscomaycush</u>) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975	75
14	Estimated monthly total numbers of slimy sculpin (<u>Cottus cognatus</u>) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975	77

I. Summary and Conclusions

The impact of the Dean H. Mitchell Station cooling water intake system on the nearby fish community of Lake Michigan was studied. Fish eggs and larvae samples were collected from May through December 1975 and fish impinged on the traveling screens of the station were sampled on a regular basis for a year.

Current velocities in the intake canal, although high (50 - 90 cm/sec.), were less than 15 cm/sec. at the traveling screens. Once fish enter the intake canal escape into the lake is probably precluded because of the presence of the stone block crib at the head of the canal.

Condenser chlorination is lethal to entrained fish eggs and larvae. Chlorine is rapidly dissipated in the discharge canal so that chlorine in recirculated ice-tempering discharge water has little or no permanent impact on fish eggs and larvae in the intake canal.

Twenty-one species of fish were removed from the Dean H. Mitchell Station traveling screens as opposed to thirteen captured in the field study program from May 1975 through April 1976. Total number and weight of all fish impinged were 158,000 and 4000 kg, respectively. Alewives (97.1%), gizzard shad (2.0%), rainbow smelt (0.2%) and yellow perch (0.3%) comprised the bulk (99.6%) of all fish impinged. Other principle taxa numerically were slimy sculpin and spottail shiner. By weights, salmonids (coho and chinook salmon and rainbow, lake and brown trout) and carp were also significant representatives. The remaining nine

species were largely incidental. The greatest number of species (11) was taken in January and fewest (5) in March. Greatest numbers of fish were impinged in June and July due to the preponderance of alewives. Total weight of impinged alewife, smelt and yellow perch were lower in 1975-76 than in 1973-74.

Impinged weight of alewife constituted 0.023% of lakewide commercial catch and only 0.0003% of lakewide biomass estimated for 1972. Weight of impinged rainbow smelt was 0.012% of commercial catch and less than 0.0001% of estimated available biomass. Yellow perch impinged were 0.012% of commercial catch weight. Salmonid species impinged were less than 0.001% of the reported sport catch. Based on the information obtained during the study and in view of available fish biomass estimates and commercial and sport catch records, the removal of fish from the lakewide populations by impingement at Dean H. Mitchell Station constituted minor, if not negligible, impact.

Five species of fish eggs and larvae were collected in plankton net entrainment samples at Dean H. Mitchell Station. They were smelt, alewife, carp, troutperch and slimy sculpin. Smelt eggs were entrained only in May, possibly after the period maximum abundance. Total losses of smelt eggs were 251,000 to 452,000 depending on flow. These losses represent the egg production of only 7 to 14 adult females.

Smelt larvae were entrained May through September with total annual losses estimated at between 1.2×10^6 and 2.1×10^6 depending on flow rates. Based on a reported survival rate of

NALCO ENVIRONMENTAL SCIENCES

1.065% this represents the offspring of 3100 and 5400 adult spawning smelt pairs.

Alewife eggs were most numerous and were entrained from May through August. Total estimated losses ranged from 1.6×10^9 to 2.4×10^9 annually depending on flow. These numbers would comprise the lost egg production of 150,000 to 229,000 adult female alewife. The greater numbers of alewife eggs in discharge canal samples than in intake canal samples suggested that eggs were originating from impinged females or from spawning fish in the discharge canal.

Alewife larvae were entrained from June through September. Length frequency distributions indicate that newly-hatched larvae are most susceptible to entrainment. Total larvae lost annually amounted to 6.8×10^6 to 9.3×10^6 depending on flow rates. Entrainment densities for alewife and smelt larvae were highest during night hours.

Carp eggs were entrained from May through August, with maximum occurrence in May. Entrained carp egg estimates totalled 454×10^6 to 815×10^6 annually depending on flow. These entrained totals represent the lost egg production of 704 to 1263 average adult female carp. Many of these eggs were attributed to spawning in the discharge canal.

Carp larvae were entrained from May through July with maximum occurrence in May. Annual totals lost were estimated between 7×10^6 and 13×10^6 carp larvae.

NALCO ENVIRONMENTAL SCIENCES

Troutperch eggs were taken irregularly from August through October. A total of 13 were collected representing the annual entrainment of 82000 to 105,000 depending on flow. Similarly 14 troutperch larvae collected from August to November represented the loss of 91000 to 129,000 troutperch larvae annually.

Six slimy sculpin eggs and two larvae were also taken in entrainment samples. Egg entrainment losses were estimated at 27000 to 39000 while larval losses were estimated at 9000 to 12000 annually depending on flow.

No salmonid eggs or larvae were obtained in entrainment samples taken from May through December.

A 100% mortality of entrained ichthyoplankton has been assumed in this report to establish worst possible case. Otto (p. 17, 1976) has suggested, however, that this is probably a conservative overestimate, especially for fish eggs, and further studies would probably show that ichthyoplankton mortalities would be substantially less than 100% under entrainment conditions typical at Dean H. Mitchell Station.

The data obtained during the study indicate that impingement of fish and entrainment of eggs and larvae at Dean H. Mitchell Station has negligible impact on the fish community of Lake Michigan. Therefore, the present cooling water intake system reflects the best available technology for minimizing impact to the fish populations.

II. Introduction

A. Objectives

Section 316(b) of Public Law 92-500 requires that the location, design, construction and capacity of cooling water intake structures reflect the "best technology available for minimizing adverse environmental impact". As required by National Pollution Discharge Elimination System Permit (NPDES) IN0000124, a one-year study was undertaken to assess the environmental impact of the present Dean H. Mitchell Station cooling water intake system.

This report provides data concerning present intake effects. Data were collected to permit the evaluation of intake effects on all life stages of fish. Quantitative sampling for fish eggs, larvae and small juveniles not removed by the barrier systems was conducted during the period of reproductive activity of Lake Michigan fish. Results permitted estimation of the total numbers of fish eggs, larvae and juveniles passed through the plant.

Adult fish were also collected from the debris barrier system to ascertain total numbers and weight lost annually through impingement at Dean H. Mitchell Station.

Ancillary data concerning the physical plant, its routine operations, intake discharge characteristics and condenser cleaning and de-icing procedures were collected.

The primary objectives of the study were to provide information on:

NALCO ENVIRONMENTAL SCIENCES

1. the total number and weight of fishes impinged on the debris barrier system at Dean H. Mitchell Station;
2. the species and number of fish eggs and larvae entrained through the plant's condenser cooling system;
3. the relationship of these results with those of a concomitant 316(a) field study and available Lake Michigan data; and,
4. the intake cooling water system configuration and function at Dean H. Mitchell Station and the possible impact of this system on the fish community of Lake Michigan.

B. Site Description

1. The Station

The fossil fueled Dean H. Mitchell Station is located on the southern tip of Lake Michigan in Gary, Indiana (Figure 1). The station utilizes once-through condenser cooling with water withdrawn from Lake Michigan through 19 pipes (36 inch diameter) positioned in a limestone block crib extending 125 feet offshore. Water travels from the crib to the plant intakes via an open intake flume. Cooling water is discharged into Lake Michigan via a discharge canal. Cooling water is discharged from the plant to the canal via pipes traversing the intake flume. The discharge canal is approximately 1000 ft. long. A 14 foot diameter pipe is located in the canal approximately 500 ft. from the onshore discharge area. The intake and discharge flumes are separated along their entire length. The separation is accomplished by steel sheet piling for the first approximately 250 ft. (Figure 1).

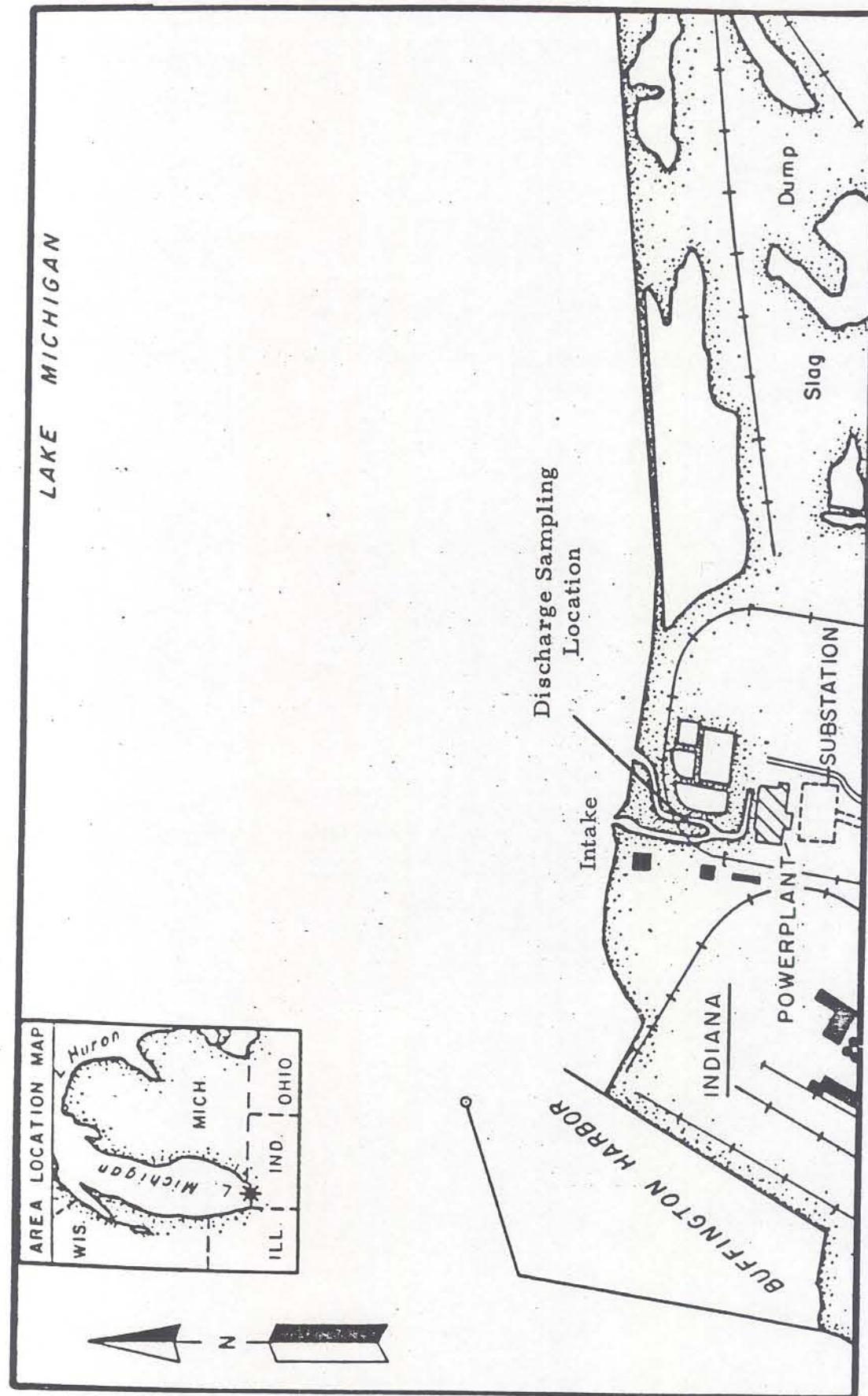


Figure 1. Schematic of layout and location of Dean H. Mitchell Station.

NALCO ENVIRONMENTAL SCIENCES

Water tempering and de-icing are accomplished by means of a valved 6 foot diameter pipe from the discharge flume to the intake crib. Recirculation usually starts about mid-November and is terminated in mid-spring when lake ambient temperatures reach about 45F. During recirculation, intake water usually consists of about 25% to 40% recirculated discharge, depending upon the number of circulating pumps operating.

Condenser cleaning is effected by chlorination with chlorine gas. A series of tests was performed in 1975 to see if chlorination could be eliminated during winter months. Observations revealed condenser slime buildup during this period without chlorination so condenser chlorination was continued. Dean H. Mitchell Station currently chlorinates once per day, 5 days per week at the rate of about 0.28 pounds per minute per operating unit over a five minute period. Based on available data (pp. 75-77 in NALCO ES 1976) concentrations of chlorine in recirculated intake water would be expected to be below standard detection limits (0.01 ppm) and would not be a hazard to fish on the traveling screens or residing in the intake canal.

Four operational units, designated as Units 4, 5, 6 and 11 utilize Lake Michigan cooling water. Power ratings (MWe) of the four units, number and rated capacities of circulating pumps, rated cooling water flow (m^3/min), design ΔT 's and number of screens are shown in Table 1. Three gas turbine units designated 9a, 9b and 9c do not use Lake Michigan water for cooling purposes and were not considered in this study.

NALCO ENVIRONMENTAL SCIENCES

Table 1. Dean H. Mitchell Station units 4, 5, 6 and 11 design operational capacities (from data provided by Northern Indiana Public Service Company).

	Unit				
	4	5	6	11	Total
Load Capacity (MWe)	138.1	138.1	138.1	115.1	529.4
Number of Circulator Pumps	2	2	2	2	8
Rated Flow of Each Pump (m ³ /min)	200.6	200.6	200.6	181.7	1567.0
Design ΔT (°F)	12.0	12.0	12.0	11.6	12.0
Number of Traveling Screens	2	2	2	2	8

2. The Intake/Trash Barrier System

The trash barrier, sluice and collection basket system at Dean H. Mitchell Station is schematized in Figure 2. Larger trash and debris retention is effected at the intake crib by the restrictive diameter of the intake pipes and the small size of the crevices between the stone blocks. At the plant, circulating pumps and condensers are further protected by electric fish screens consisting of electrified 3 inch diameter pipes about 18 inches apart which are intended to induce avoidance of the area in fish as well as restrain heavy trash and debris. No information was available on the operation or effectiveness of the electric screen in reducing numbers of fish impinged. Subfloor trash racks consisting of vertical steel bars about 2-1/2 inches apart are located behind the fish screens. Grids have been placed in the floor above the trash racks for the observation and removal of large fish and debris. The traveling screens consist of wire gridwork with 3/16 inch by 22-1/2 inch openings. The screens serve to restrain incoming fish, filamentous algae and smaller trash and debris from the cooling system. When activated, the screens travel vertically on a continuous belt, lifting impinged materials into a high pressure jet of water which washes these materials from the screen into a concrete sluiceway. The material is carried into a trash collection basket. The trash collection baskets are constructed of steel grid with a mesh of about 1 inch by 1/4 inch. The material collected in the trash basket is removed periodically to appropriate dumping sites.

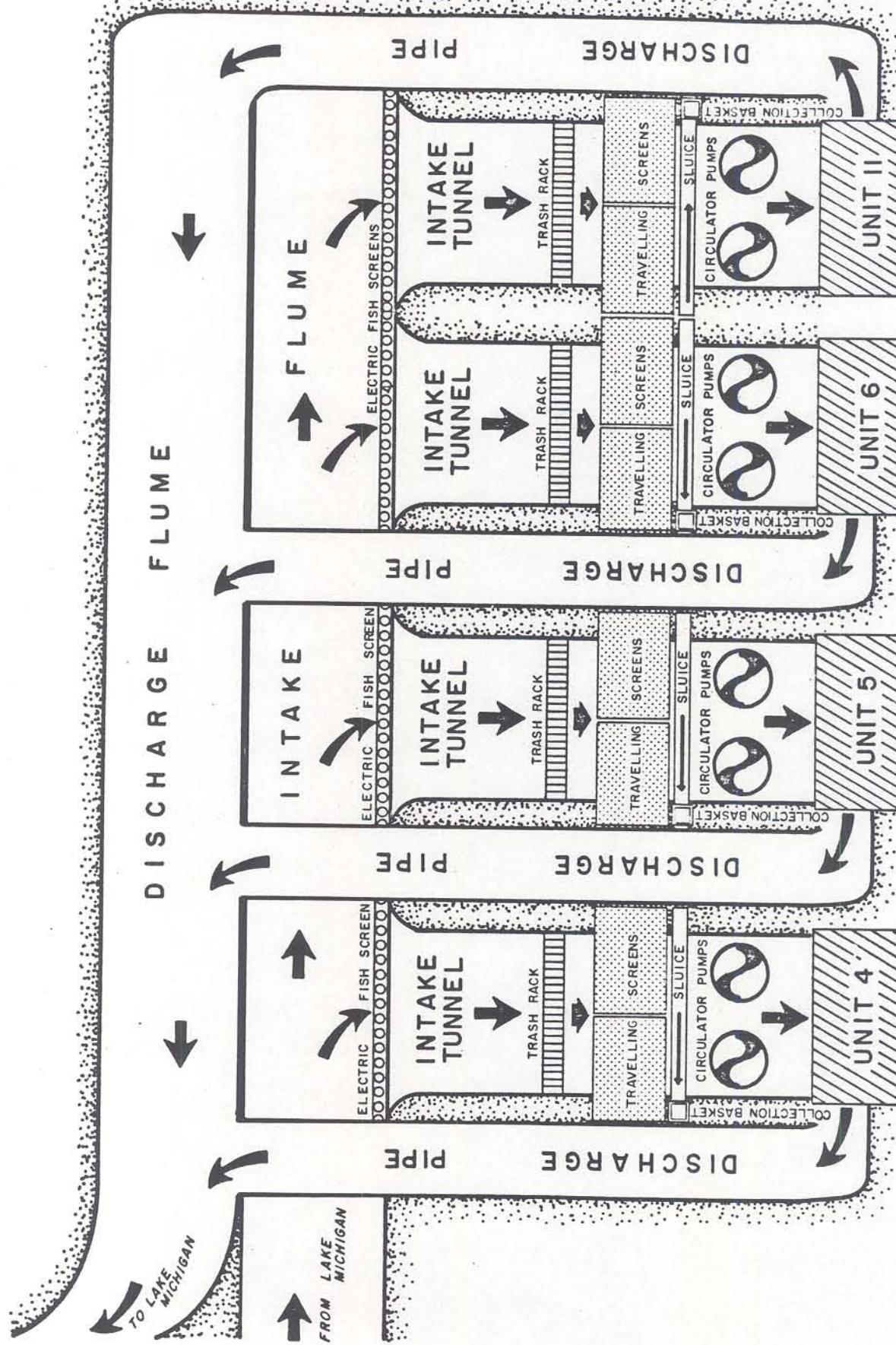


Figure 2. Schematic diagram of in-plant intake structures at Dean II, Mitchell Station.

III. Materials and Methods

A. Station Operations

Monitoring plant operations was conducted every eight hours over a 24-hour sampling period every fourth day from 3 May through 30 December 1975. Plant monitoring was performed once each sampling day from 3 January through 30 April 1976. Data taken included intake and discharge temperatures, intake flow (m^3/min) and electrical loading of each unit. Intake flow was deduced from the number of circulator pumps running and their known rated capacities. The number of operational traveling screens was also noted during operations monitoring.

Current velocity measurements were made in October 1975 and April 1976. Current velocities were measured at intake and discharge canal entrainment sampling locations (Figure 1) as well as in each intake tunnel immediately in front of the trash racks (Figure 2). Velocities were measured using a General Oceanics digital flow-meter with a lower detection limit of approximately 15 cm/sec.

B. Impingements

The traveling screens and trash racks were monitored for impinged fish over a 24-hour period. The screens and baskets were cleared of fish and debris by station personnel at midnight of the previous night. Every eight hours thereafter the screens were washed and impinged fish were accumulated for the 24-hour period. Fish were sorted by species. When the number of fish of a given species was less than 100, all fish were individually

NALCO ENVIRONMENTAL SCIENCES

weighed (grams) and measured (total length in cm). When the number of fish of a given species exceeded 100, the total of each species was derived from the subsamples and the total species weight was determined. A random subsample of 100 was taken and each fish weighed individually. A mean weight of fish of each species was derived from the subsamples and the total number of fish was estimated by dividing total weight by mean weight. These total fish numbers and weights were then extrapolated to monthly total estimates utilizing the following equation:

$$\text{Total number} = \frac{\text{number of days in month}}{\text{number of sample days}} \times \frac{\text{total number (weight) for all sample days}}{\text{sample days}}$$

Length frequency distributions (histograms) were constructed for species of sufficiently frequent occurrence.

Results of the impingement studies were compared to appropriate available data including Lake Michigan catch records from Illinois, Indiana, Michigan, Limnetics (1976) and field data collected as part of the Dean H. Mitchell Station 316(a) demonstration (NALCO ES 1976).

C. Egg and Larvae Entrainment

1. Sample Collection

Entrained fish eggs and larvae were sampled every fourth day from 3 May through 28 December 1975. Four one-half meter diameter Nitex cone plankton nets with #2 mesh (351μ) aperture were allowed to drift in the current of the discharge, two near the surface, one at mid-depth and one just above bottom.

Sample volumes were measured using a General Oceanics digital flow-meter suspended centrally in each net opening. Sample sizes of approximately 100 m³ were sought in each of four replicate samples taken every eight hours over the 24-hour period.

Initially (3 through 19 May) quadruplicate samples were taken in the discharge canal (Figure 1). From 23 May through 8 June samples were taken from both the discharge (2 replicates) and the intake flume. From 8 June through 31 July all samples were again taken from the discharge canal. Starting 3 August the entrainment sampling program was expanded to include quadruplicate sampling of the intake canal every eight hours on alternate sampling days (i.e. - every eighth day). These additional samples were intended to demonstrate whether or not discharge egg counts may be excessive due to loss of eggs by impinged females and/or spawning in the discharge canal by resident carp or alewife.

Clogging of sampling nets occurred frequently due to copious filamentous algae during summer months. Nets were raised and cleared by repeated immersion in the canal. Plankton nets were fished and continually cleared for periods (often as long as 40 minutes) sufficient to filter the pre-determined sample volume of 100 m³.

2. Sample Analysis

All replicates collected were scrutinized for fish eggs and larvae under a magnifying lens equipped with a fluorescent light. Eggs and larvae were counted, measured, and identified under a stereozoom microscope equipped with an ocular micrometer.

NALCO ENVIRONMENTAL SCIENCES

Identifications were based on size, morphometric characteristics and known spawning times of fishes indigenous to Lake Michigan. When numbers of eggs were prohibitive, a Folsom sample splitter was used to subsample the total replicate. The entire sample was then scrutinized to detect eggs and larvae of other species present in lower numbers. In all cases, at least 25 eggs or larvae were measured (diameter or total length to 0.1 mm) as indicators of range of size for species of numerous occurrence in the replicate.

3. Data Analysis

Abundance (number/m³) was estimated for each replicate by dividing the number of eggs or larvae of each species by the volume of water sampled. Mean abundance for the eight-hour period was the average of the four replicates.

Mean abundances (number/m³) of eggs and larvae were used to estimate the total numbers which would be entrained at capacity flow (1567 m³/min) as well as average observed flow for each entire month. Monthly entrainment totals were based on all 8-hour sampling periods using the formula:

$$\text{Total entrained} = V \times \frac{\text{number of days in month}}{\text{number of sample days}} \times \sum \text{mean abundance (No./m}^3\text{)} \text{ for each 8-hr period}$$

where $V = 752,160 \text{ m}^3$, the volume pumped in eight hours at capacity flow (1567 m³/min). Totals were also estimated using $V = \text{volume in eight hours at average observed flow}$.

NALCO ENVIRONMENTAL SCIENCES

IV. Results and Discussion

A. Station Operations

Operational monitoring data collected on each sampling day are presented in Tables A-1 through A-12, Appendix A. Monthly averages of operational parameters are summarized in Table 2. Power output at Dean H. Mitchell Station was found to be fairly consistent on a daily basis but varied widely by month. Monthly average (differential) temperatures varied from 9F to 16F with observed daily ranges of 3F and 21F. The largest observed ΔT of 21F was observed on 27 February 1976 with turbine capacity at 65% (346 MWe) and circulator flow 37% ($583 \text{ m}^3/\text{min}^{-1}$) and de-icing circulation at 26%. Unit 4, was off-line during February and March.

Plant personnel were cooperative during the impingement program and collected impingement data for in-plant use on days between the sampling dates of the impingement monitoring program.

The current practice of not permitting the return of impinged fish and debris to Lake Michigan obviates the necessity of relating chlorine recirculation to impact on impinged fish. Results of the chlorine monitoring studies (pp. 75-77 in NALCO ES 1976) suggest that chlorine concentrations would be below detection limits after recirculation into the intake canal. Therefore, chlorination does not constitute an additional hazard to fish in the intake canal.

Current velocity measurements in October 1975 and April 1976 showed that regardless of numbers of pumps operating, current velocity at surface, mid-depth and bottom levels immediately in

NALCO ENVIRONMENTAL SCIENCES

Table 2. Monthly averages of operational parameters at Dean H. Mitchell Station from May 1975 through April 1976.

Month	No. of Sample Days	Temperatures ($^{\circ}$ F)		ΔT	Power Load MWe	% Capacity	Circulator Flow m^3/min	% Capacity
		Intake	Discharge					
1975								
May	8	56	70	14	347	66	871.3	56
June	7	59	74	15	406	77	1099.6	70
July	8	69	78	9	338	64	1257.3	80
August	8	69	80	11	386	73	1296.9	83
September	7	67	79	12	401	76	1227.7	78
October	8	59	73	14	351	66	963.0	61
November	7	50	65	15	309	58	894.3	57
December	8	41	53	12	306	58	1202.9	77
1976								
January ^a	8	34	50	16	350	66	951.9	61
February ^a	7	41	55	14	294	56	827.3	53
March	8	42	53	11	246	47	783.5	50
April	7	49	61	12	254	48	921.4	59

^aRecirculation in operation.

front of the trash racks were sufficiently low (< 15 cm/sec) that normal, healthy fish could escape provided the intake area is not obstructed. Intake and discharge canal velocities of 50 to 90 cm/sec were, however, noted at plankton net sampling locations. Velocities of 50 cm/sec were measured at the bottom level in October and April. Mid-depth velocities were 85-90 cm/sec and 70 cm/sec in these two months, respectively. Higher velocities of 85-90 cm/sec were measured at the surface for both months. Although many larger fish, especially marauding, predatory species like salmonids, are capable of achieving high "burst" speeds, few fish are capable of sustaining such speeds for extended periods (Otto et al 1975). The relatively high intake canal current velocities could enhance the probability of impingement of fish in the canal. Other factors, such as spawning fatigue, could be a primary cause relating to impingement. Also, power plants such as Dean H. Mitchell Station may serve as collection foci of stressed fish rather than sources of impact on normal healthy fish populations.

B. Impingement

Twenty-one species of fish were removed from the traveling screens at Dean H. Mitchell Station from 3 May 1975 through 27 April 1976 (Figure 3, Tables B-1 through B-12, Appendix B). Rainbow smelt were present in every month. Alewife were present in all but one month (March). Spottail shiners and slimy sculpins were present during nine months and gizzard shad and troutperch occurred two-thirds of the time (eight months). Nine-spine stickleback were present April through July and brown trout were taken December

SPECIES	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Alewife												
Rainbow smelt												
Gizzard shad												
Yellow perch												
Troutperch												
Slimy sculpin												
Spottail shiner												
Ninespine stickleback												
Carp												
Coho salmon												
Chinook salmon												
Rainbow trout												
Lake trout												
Brown trout												
Emerald shiner												
Common shiner												
White sucker												
Largemouth bass												
Green sunfish												
Goldfish												
Bluntnose minnow												

Figure 3. Monthly occurrence of Lake Michigan fish on the Dean H. Mitchell Station traveling screens, May 1975 through April 1976.

NALCO ENVIRONMENTAL SCIENCES

through February. The remaining twelve species occurred only three months or less. (Figure 3, Tables B-1 through B-12, Appendix B).

Only thirteen species were reported in quarterly gill net lake sampling (p. 216 in NALCO ES 1976). Two species found in gill nets but not impinged at Dean H. Mitchell Station were bloater and Atlantic salmon. Species impinged but not taken in gill nets were slimy sculpin, ninespine stickleback, carp, emerald shiner, common shiner, white sucker, largemouth bass, green sunfish, goldfish and bluntnose minnow. None are on the endangered or threatened species list for Indiana (p. 265 in NALCO ES 1976).

Monthly impingement was generally 8-10 species per month with most species (11) occurring in January and fewest species (5) in March (Figure 3, Tables B-1 through B-12, Appendix B).

A total of 157,518 fish, comprising 4013 kg by weight, was estimated as the annual loss due to impingement at Dean H. Mitchell Station (Table 3). Individual monthly estimated totals are presented by species in Tables 4 and 5. Individual sample data are presented by month in Tables B-1 through B-12, Appendix B.

Numerically the most abundant fishes were alewife, gizzard shad, yellow perch, rainbow smelt, slimy sculpin, spottail shiner and troutperch. These comprised 99.9% of all fish taken. Fourteen other species, including salmonids, made up the remaining fish impinged and comprised less than 0.1% of all fish impinged (Table 3).

1. Alewife

Maximum numbers of alewife occurred in May and June (14×10^3 and 11×10^3 , respectively) (Tables B-1 and B-2, Appendix B).

NALCO ENVIRONMENTAL SCIENCES

Table 3. Annual estimated total numbers and weight (Kg) of fish impinged on the traveling screens at Dean H. Mitchell Station from May 1975 through April 1976.

	Total Number	%	Weight (Kg)	%
Alewife	152,965	97.1	3832.811	95.5
Rainbow smelt	353	0.2	4.077	0.1
Gizzard shad	3087	2.0	53.474	1.3
Yellow perch	528	0.3	47.305	1.2
Troutperch	104	0.1	1.479	<0.1
Coho salmon	8	>0.1	4.263	0.1
Chinook salmon	4	>0.1	11.431	0.3
Rainbow trout	16	<0.1	9.869	0.2
Lake trout	12	<0.1	3.847	0.1
Brown trout	16	<0.1	2.270	0.1
Spottail shiner	122	0.1	0.943	<0.1
Common shiner	41	>0.1	0.227	>0.1
Emerald shiner	39	>0.1	0.194	<0.1
Bluntnose minnow	4	>0.1	0.021	<0.1
Largemouth bass	4	<0.1	0.058	<0.1
Green sunfish	4	<0.1	0.019	<0.1
White sucker	8	<0.1	4.716	0.1
Carp	16	<0.1	32.453	0.8
Goldfish	8	<0.1	1.950	<0.1
Slimy sculpin	134	0.1	1.743	<0.1
Ninespine stickleback	45	<0.1	0.221	<0.1
Total:	157,518	-	4013.371	-

NALCO ENVIRONMENTAL SCIENCES

Table 4. Estimated monthly total numbers of fish impinged at Dean H. Mitchell Station, May 1975 through April 1976.

Species	Month					October
	May	June	July	August	September	
Alewife	52979	48561	9087	849	60	267
Rainbow smelt	23	51	66	46	39	12
Slimy sculpin	15	13	35	31	4	4
Spottail shiner	11	17	12	12	13	4
Troutperch	8	26	23	8	4	4
Ninespine stickleback	8	13	8	0	0	4
Coho salmon	4	0	0	0	0	0
Lake trout	4	0	0	0	0	0
Carp	4	0	4	0	4	0
Brown trout	0	4	0	0	0	0
Yellow perch	0	9	0	0	0	0
Rainbow trout	0	0	4	0	17	0
Green sunfish	0	0	4	0	0	0
Emerald shiner	0	0	0	0	0	0
Common shiner	0	0	0	39	0	0
White sucker	0	0	0	23	0	0
Largemouth bass	0	0	0	4	0	0
Gizzard shad	0	0	0	4	0	0
Chinook salmon	0	0	0	0	4	4
Goldfish	0	0	0	0	4	4
Bluntnose minnow	0	0	0	0	0	0

NALCO ENVIRONMENTAL SCIENCES

Table 4. (continued)

Species	November	December	January	February	March	April
Alewife	32768	5345	19	17	0	3013
Rainbow smelt	4	75	16	4	4	13
Slimy sculpin	8	4	16	0	0	4
Spottail shiner	4	18	27	4	0	0
Troutperch	4	0	27	0	0	0
Ninespine stickleback	0	0	12	0	0	0
Coho salmon	0	0	0	0	0	0
Lake trout	0	0	0	0	0	4
Carp	0	0	0	0	4	0
Brown trout	0	0	0	0	4	0
Yellow perch	0	4	8	0	0	0
Rainbow trout	8	44	4	4	0	0
Green sunfish	0	0	12	0	0	0
Emerald shiner	0	0	4	8	0	4
Common shiner	0	0	0	0	0	0
White sucker	0	0	18	0	0	0
Largemouth bass	0	4	0	0	0	0
Gizzard shad	0	0	0	0	0	0
Chinook salmon	75	1940	1027	8	0	0
Goldfish	0	0	0	0	8	21
Bluntnose minnow	0	4	0	0	0	0
		0	0	4	0	4

NALCO ENVIRONMENTAL SCIENCES

Table 5. Estimated monthly total weights (kg) of fish impinged at Dean H. Mitchell Station, May 1975 through April 1976.

Species	May	June	July	Month	August	September	October
Alewife	2080.766	1289.036	234.953	25.575	1.071	1.821	
Rainbow smelt	0.659	0.750	0.388	0.260	0.364	0.097	
Slimy sculpin	0.213	0.129	0.601	0.523	0.021	0.019	
Spottail shiner	0.097	0.150	0.155	0.097	0.064	0.019	
TROUTPERCH	0.135	0.471	0.329	0.097	0.064	0.019	
Ninespine stickleback	0.039	0.064	0.039	0	0.064	0.058	
Coho salmon	1.182	0	0	0	0	0	
Lake trout	1.105	0	0	0	0	0	
Carp	-a	0	0	0	0	0	
Brown trout	0	1.200	1.453	0	0.107	0	
Yellow perch	0	0.621	22.339	0	0	0	
Rainbow trout	0	0	5.851	0	0	0	
Green sunfish	0	0	0.019	0	0	0	
Emerald shiner	0	0	0	0.194	0	0	
Common shiner	0	0	0	0.116	0	0	
White sucker	0	0	0	4.650	0	0	
Largemouth bass	0	0	0	0.058	0	0	
Gizzard shad	0	0	0	0	0	0	
Chinook salmon	0	0	0	0	0.043	0.058	
Goldfish	0	0	0	0	0	11.431	
Bluntnose minnow	0	0	0	0	0	0	

a No weight estimate possible.

NALCO ENVIRONMENTAL SCIENCES

Table 5. (continued)

Species	November	December	January	February	March	April
Alewife	70.912	38.830	0.310	0.373	0	89.164
Rainbow smelt	0.019	0.598	0.310	0.104	0.078	0.450
Slimy sculpin	0.075	0.044	0.097	0	0	0.021
Spottail shiner	0.019	0.089	0.232	0.021	0	0
Troutperch	0.112	0	0.213	0	0	0
Ninespine stickleback	0	0	0.058	0	0	0.021
Coho salmon	0	0	0	0	3.081	0
Lake trout	0	0	0	0	2.635	0
Carp	0	0	31.000	0	0	0
Brown trout	0	0.465	0.232	0.373	0	0
Yellow perch	0.412	4.739	0.058	0	1.298	0.643
Rainbow trout	0	0	3.003	1.015	0	0
Green sunfish	0	0	0	0	0	0
Emerald shiner	0	0	0	0	0	0
Common shiner	0	0.111	0	0	0	0
White sucker	0	0.066	0	0	0	0
Largemouth bass	0	0	0	0	0	0
Gizzard shad	0.862	33.582	17.457	0.497	0.504	0.471
Chinook salmon	0	0	0	0	0	0
Goldfish	0	1.329	0	0.621	0	0
Bluntnose minnow	0	0	0	0	0	0.021

NALCO ENVIRONMENTAL SCIENCES

Smaller secondary peaks occurred in November and December (8700 and 1200 respectively) (Tables B-7 and B-8, Appendix B). From July through October numbers of impinged alewife were low (Tables B-3 through B-6, Appendix B). After the occurrence of juveniles in November and December, alewives were virtually absent during January, February and March (5, 4 and 0 respectively) (Tables B-9 through B-11, Appendix B). In April, the annual spring increase of spawning adults was seen to recur (Table B-12, Appendix B).

Total numbers of alewife impinged monthly varied from 0 in March to 14000 in May (Tables B-1 through B-12, Appendix B). The total monthly impinged weight of alewives ranged from 537 kg in May to none in March (Tables B-1 through B-12, Appendix B). Monthly estimated total numbers impinged ranged from 0 in March to 53000 in May while estimated total weight impinged monthly ranged from 0 kg in March to 2080 kg in May. The estimated total number of alewife impinged annually, 153,000, comprised 97.1% of all fish impinged while the total estimated weight of alewives, 3833 kg, represented 95.5% of all fish impinged (Table 3).

Monthly frequency distributions for total length were generated from May through December with the exception of the month of September (Figures 4 through 10). The most frequently encountered length was 17.5 cm in May and June and 18.0 cm in July through August. Total lengths ranged from 6.0 cm to 22.5 cm (Figures 4 through 7). During October, November and December alewives were fewer and smaller. The total lengths of the fishes impinged at this time reflected these smaller size (age) groups with

NALCO ENVIRONMENTAL SCIENCES

ALEWIFE - MAY

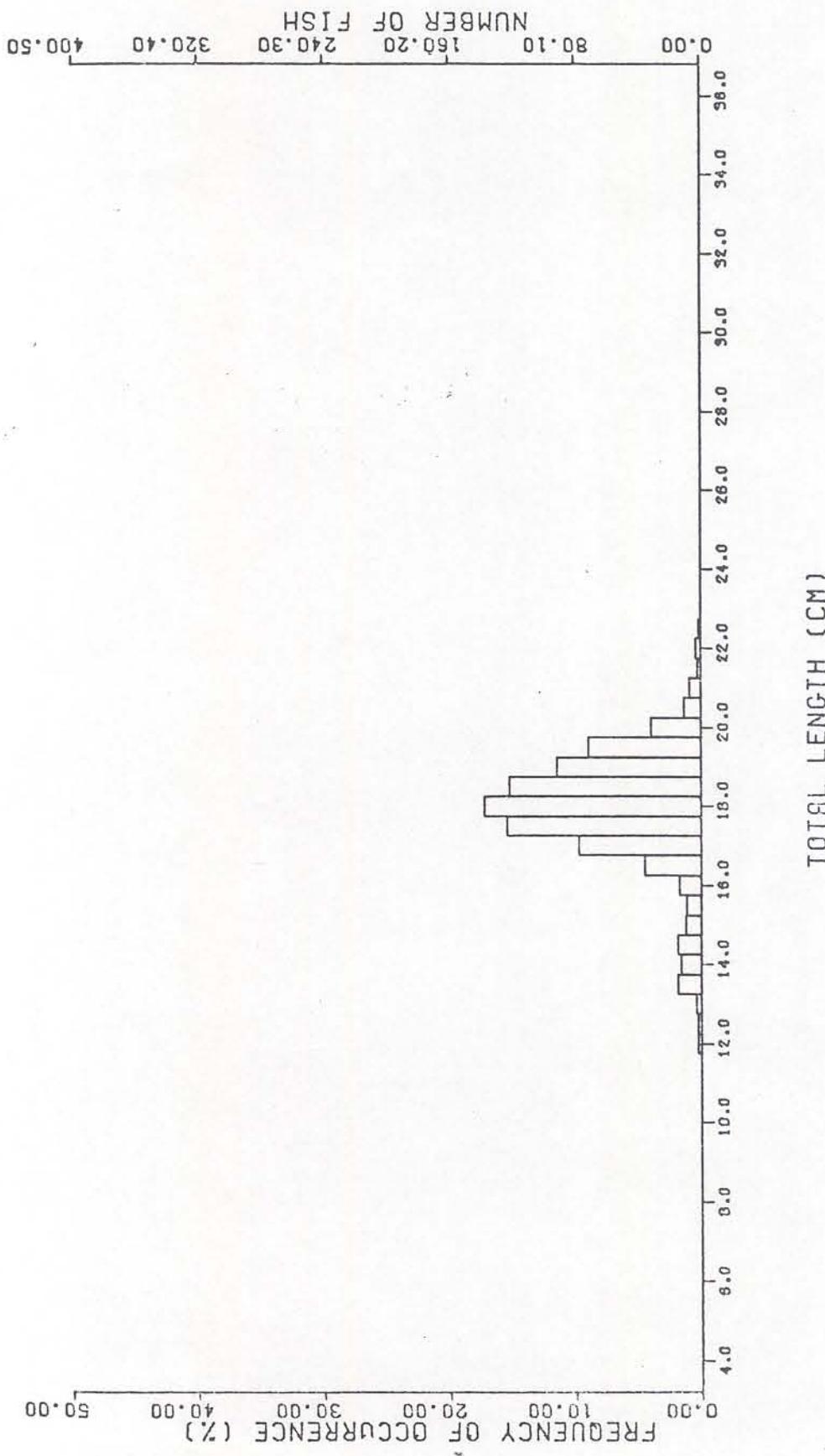


Figure 4. Length frequency distribution of alewife collected from the Dean H. Mitchell Station travelling screens during May 1975.

NALCO ENVIRONMENTAL SCIENCES

ALEWIFE - JUNE

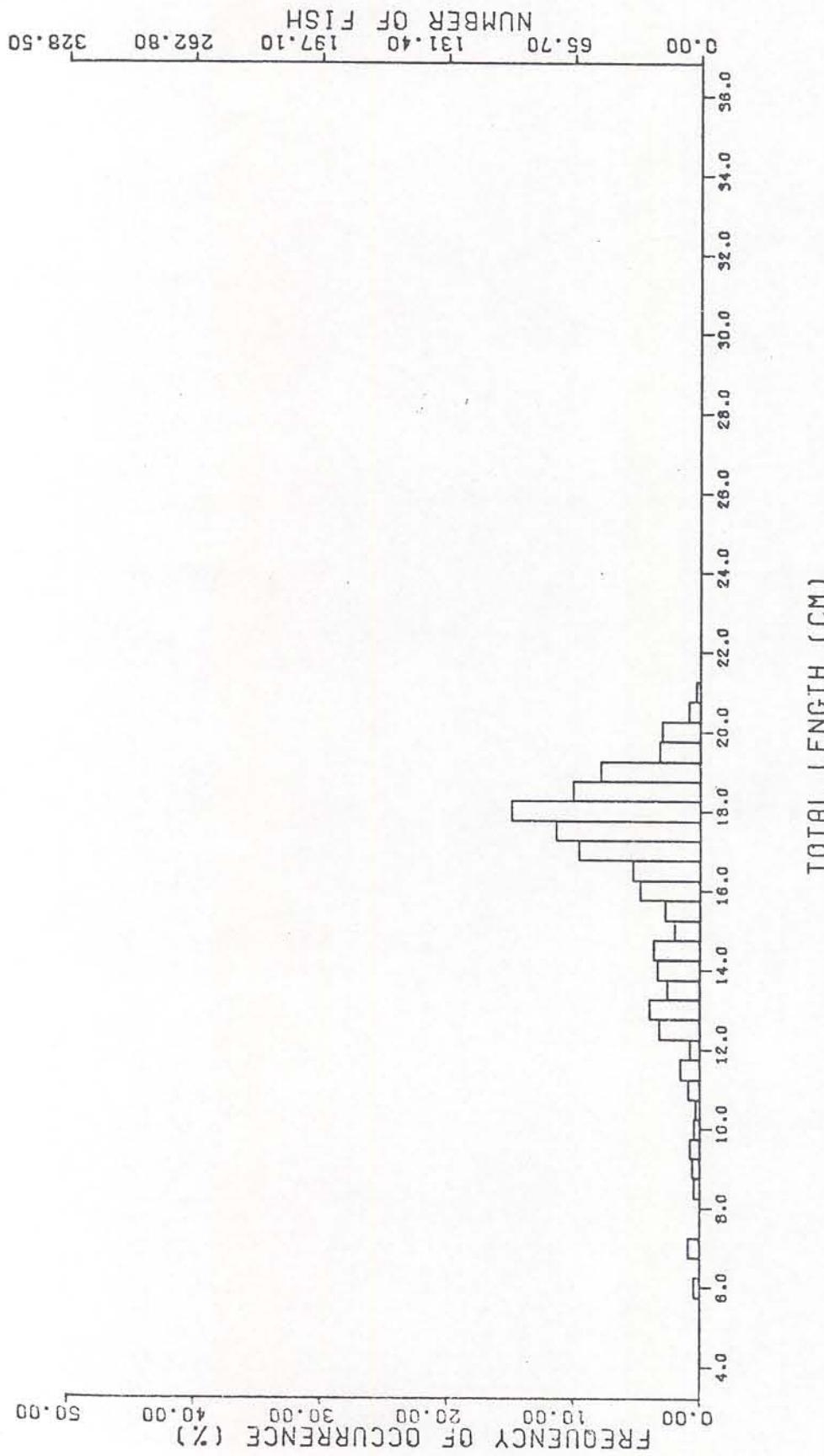


Figure 5. Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during June 1975.

NALCO ENVIRONMENTAL SCIENCES

ALEWIFE - JULY

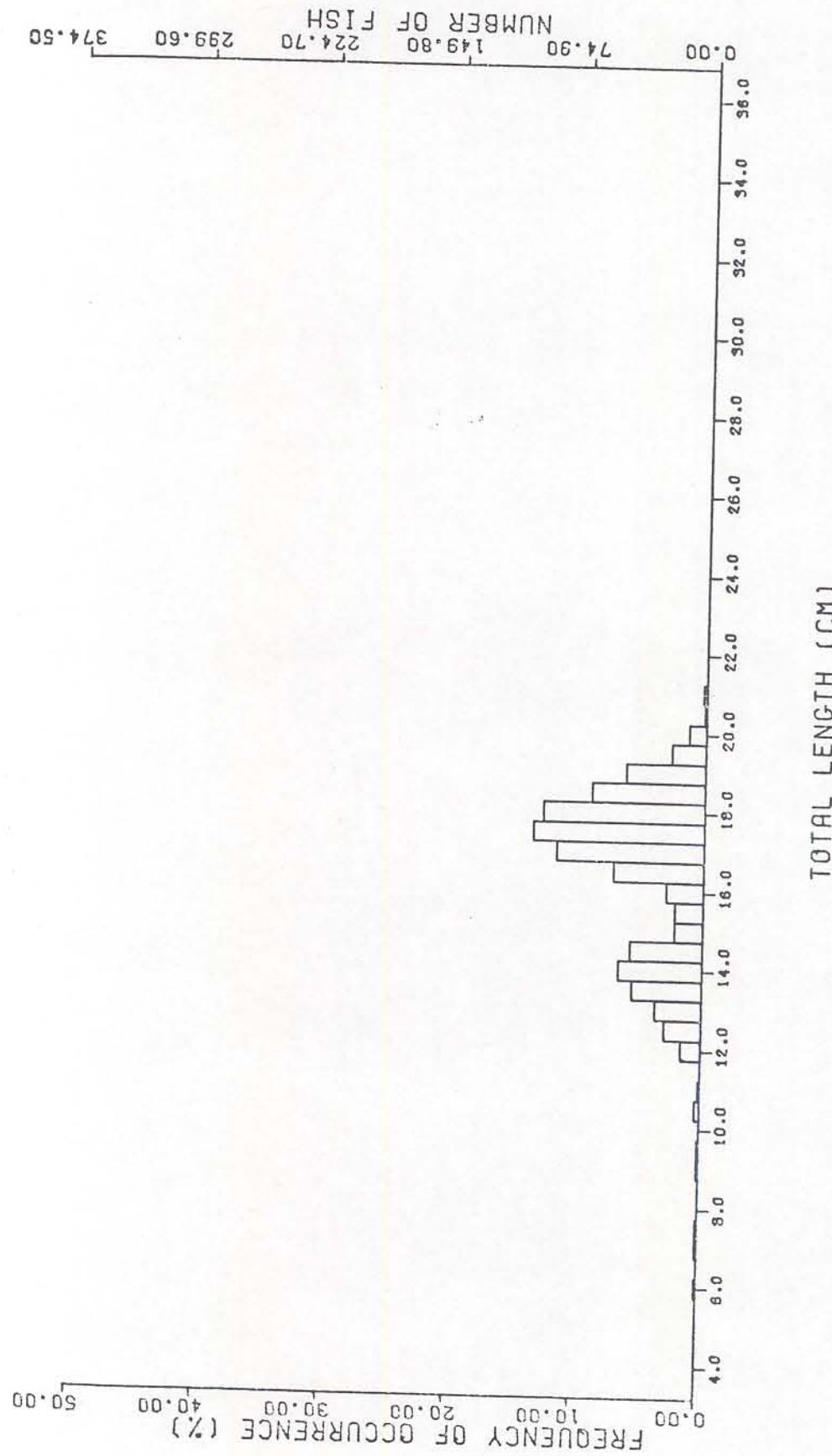


Figure 6. Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during July 1975.

NALCO ENVIRONMENTAL SCIENCES

ALEWIFE - AUGUST

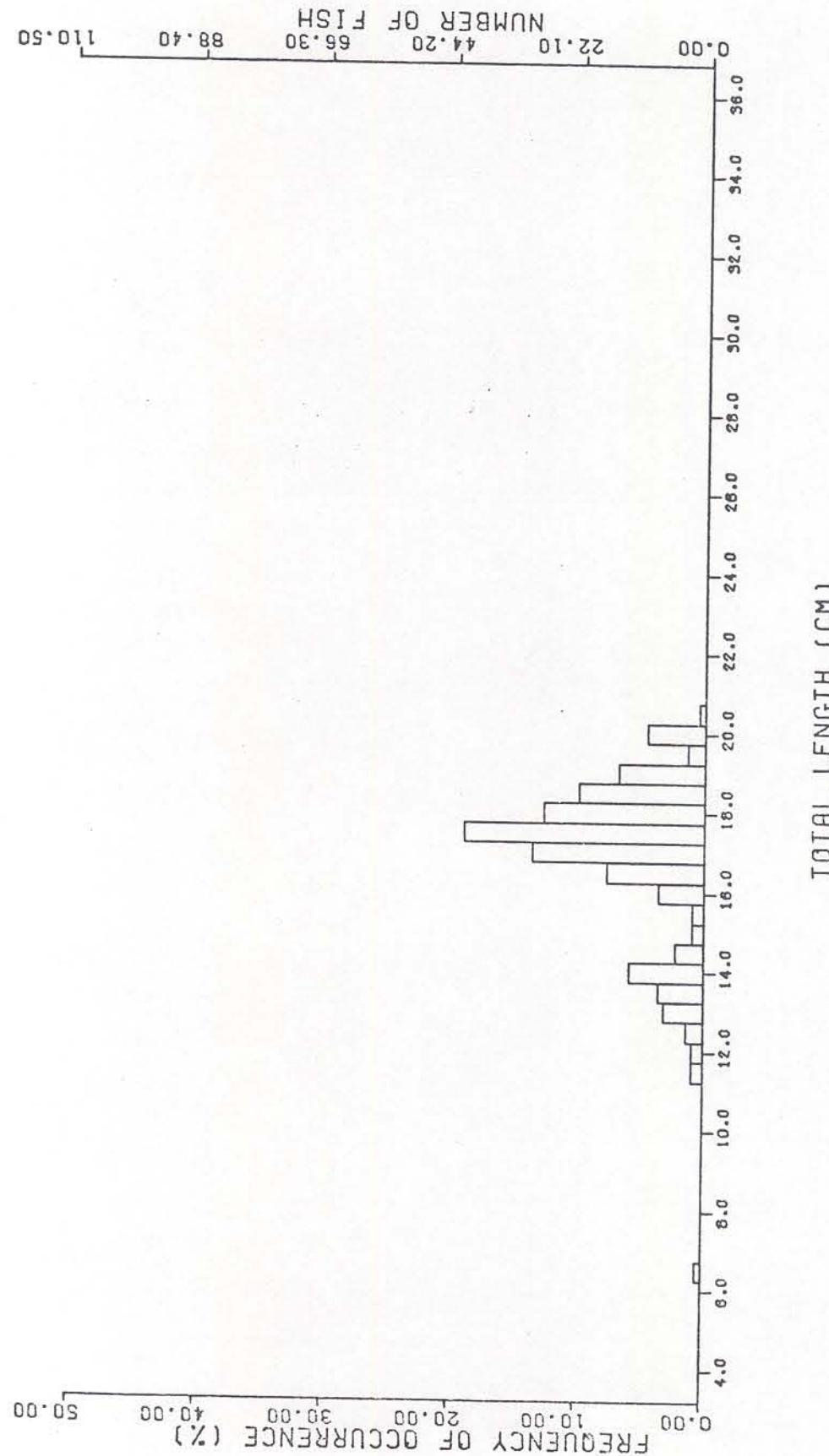


Figure 7. Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during August 1975.

NALCO ENVIRONMENTAL SCIENCES

ALEWIFE - OCTOBER

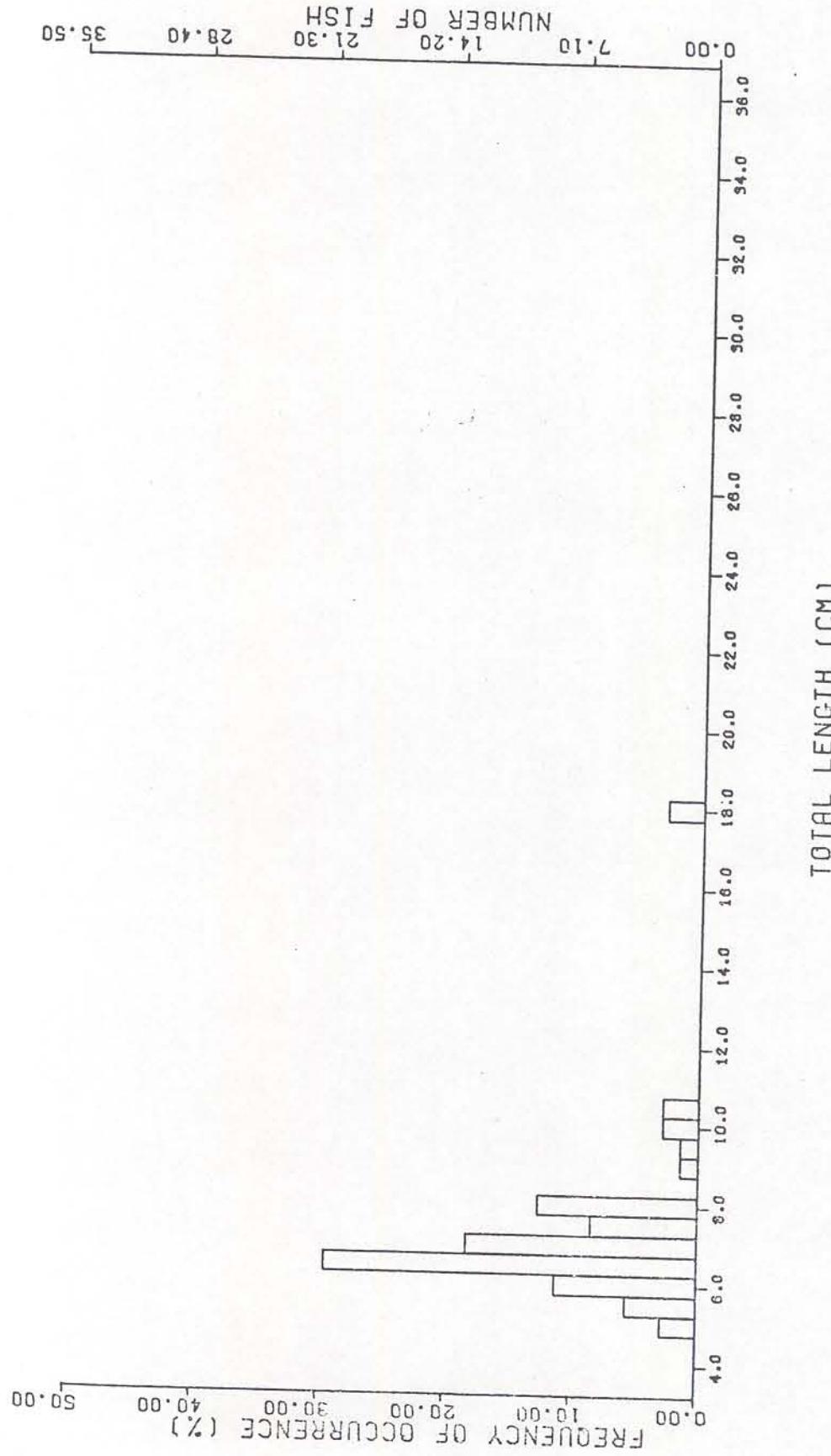


Figure 8. Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during October 1975.

NALCO ENVIRONMENTAL SCIENCES

ALEWIFE - NOVEMBER

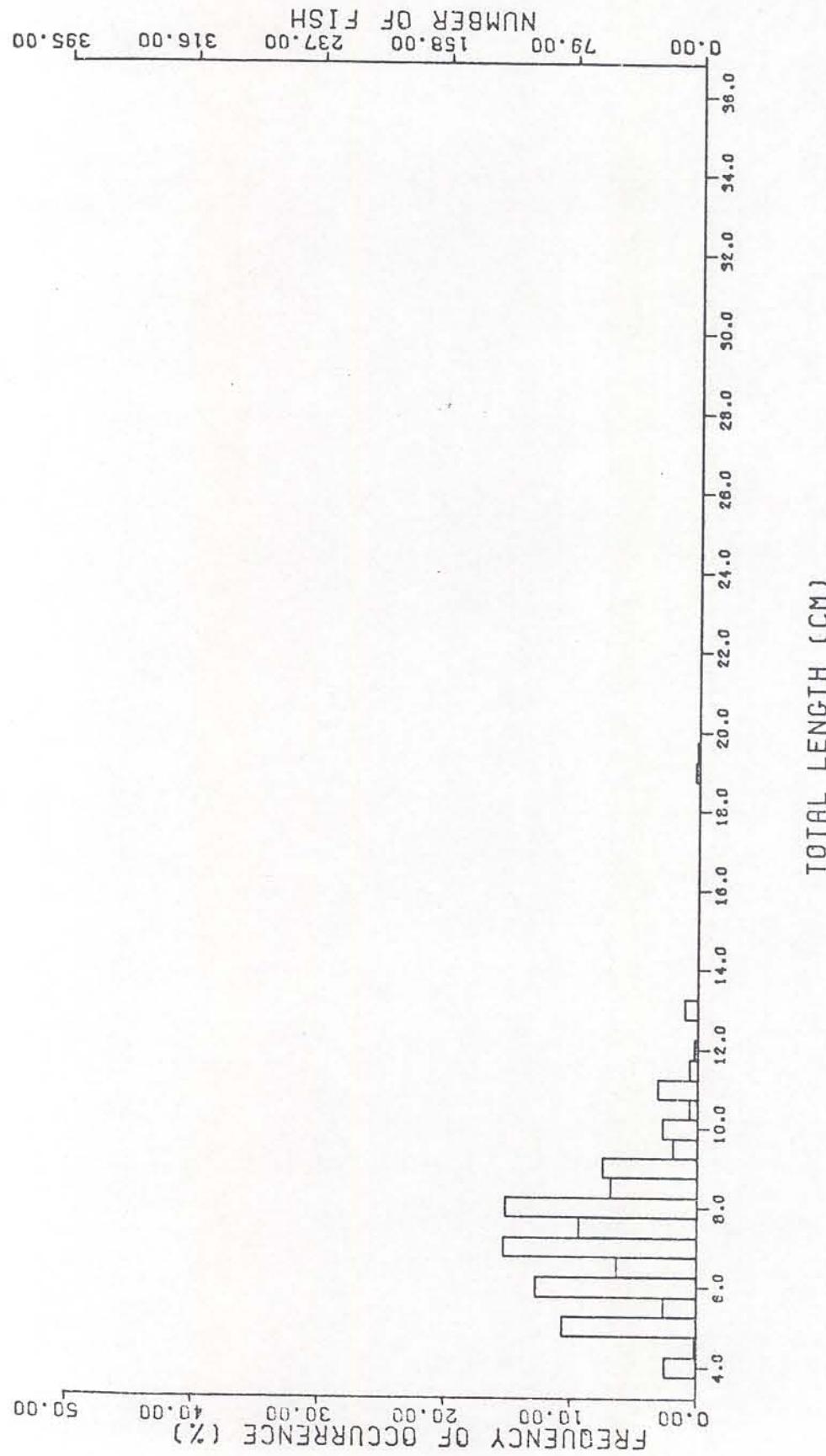
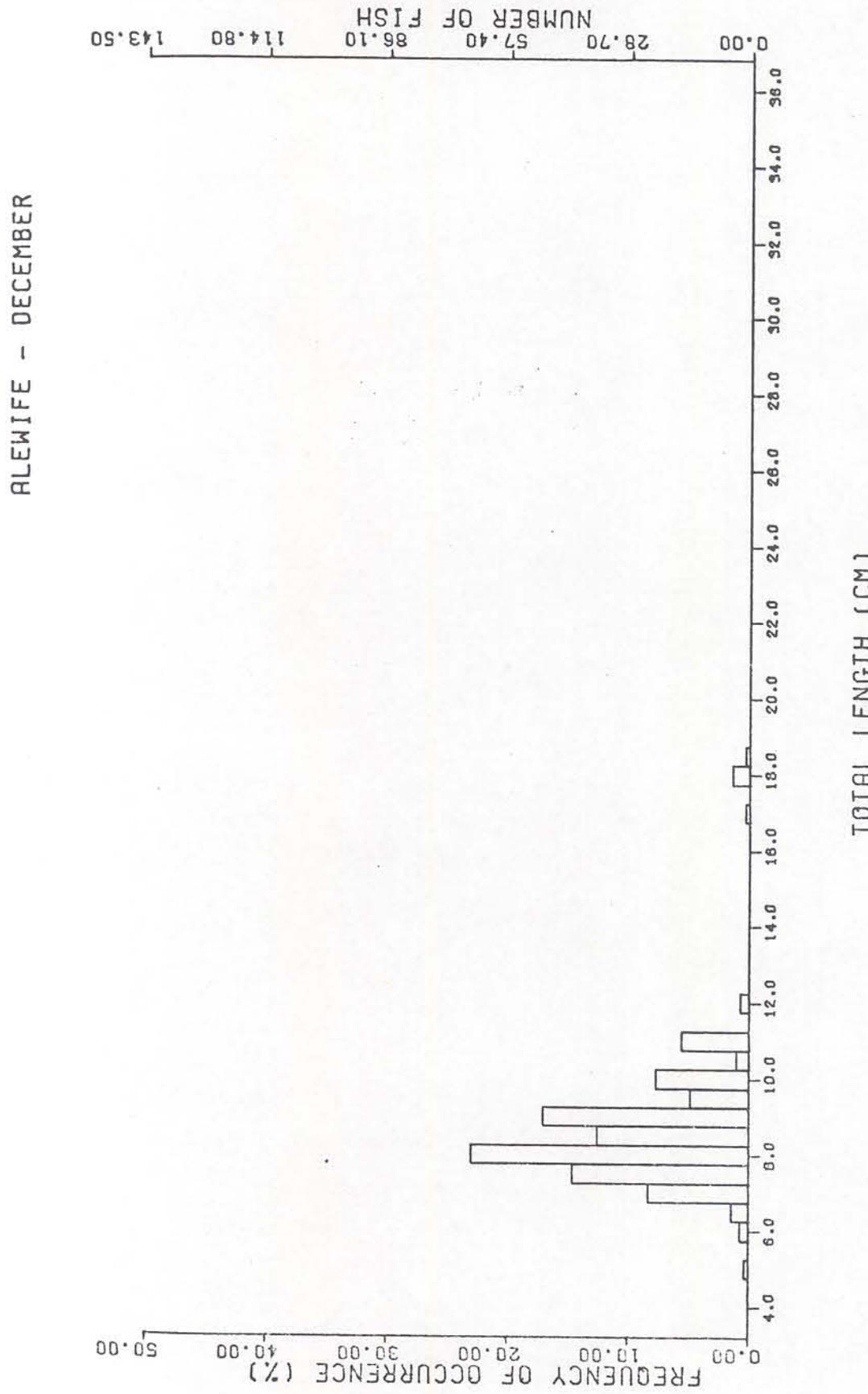


Figure 9. Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during November 1975.

NALCO ENVIRONMENTAL SCIENCES



Length frequency distribution of alewife collected from the Dean H. Mitchell Station traveling screens during December 1975.

Figure 10.

NALCO ENVIRONMENTAL SCIENCES

the mode at about 7-8 cm. Total lengths ranged from 4.0 cm to 13.0 cm with one or two fish of 18-20 cm total length (Figures 8 through 10).

2. Gizzard shad

Gizzard shad first appeared among impinged fish in September (Figure 3, Tables B-1 through B-12, Appendix B) but did not reach maximum occurrence until December when more than 400 were taken (Table B-8, Appendix B). They continued to be present but in lesser numbers in January after which time their numbers declined (Tables B-9 through B-12, Appendix B). During December and January, total weights, of 7.6 kg and 4.5 kg of gizzard shad were collected (Tables B-8 and B-9, Appendix B) reflecting monthly estimated total numbers of 1940 and 1027, respectively. The monthly estimated totals reflect estimated weights of 33.6 kg and 17.5 kg for December and January, respectively (Tables 4 and 5).

Total annual losses of gizzard shad were estimated to be 3087 (53.5 kg) comprising 2.0% (1.3% by weight) of the total estimated impinged fish (Table 3).

Total length frequency distributions were plotted for gizzard shad impinged in December and January (Figures 11 and 12). The mode for total length values was 12.0 cm and the lengths ranged from 5.0 cm to 21.5 cm for both months. The mode is indicative of immature fish and does not represent the impingement of adult, spawning fish.

3. Yellow Perch

Impinged yellow perch occurred in maximum numbers in July and August (43 and 65 respectively) (Tables B-3 and B-4,

GIZZARD SHAD - DECEMBER

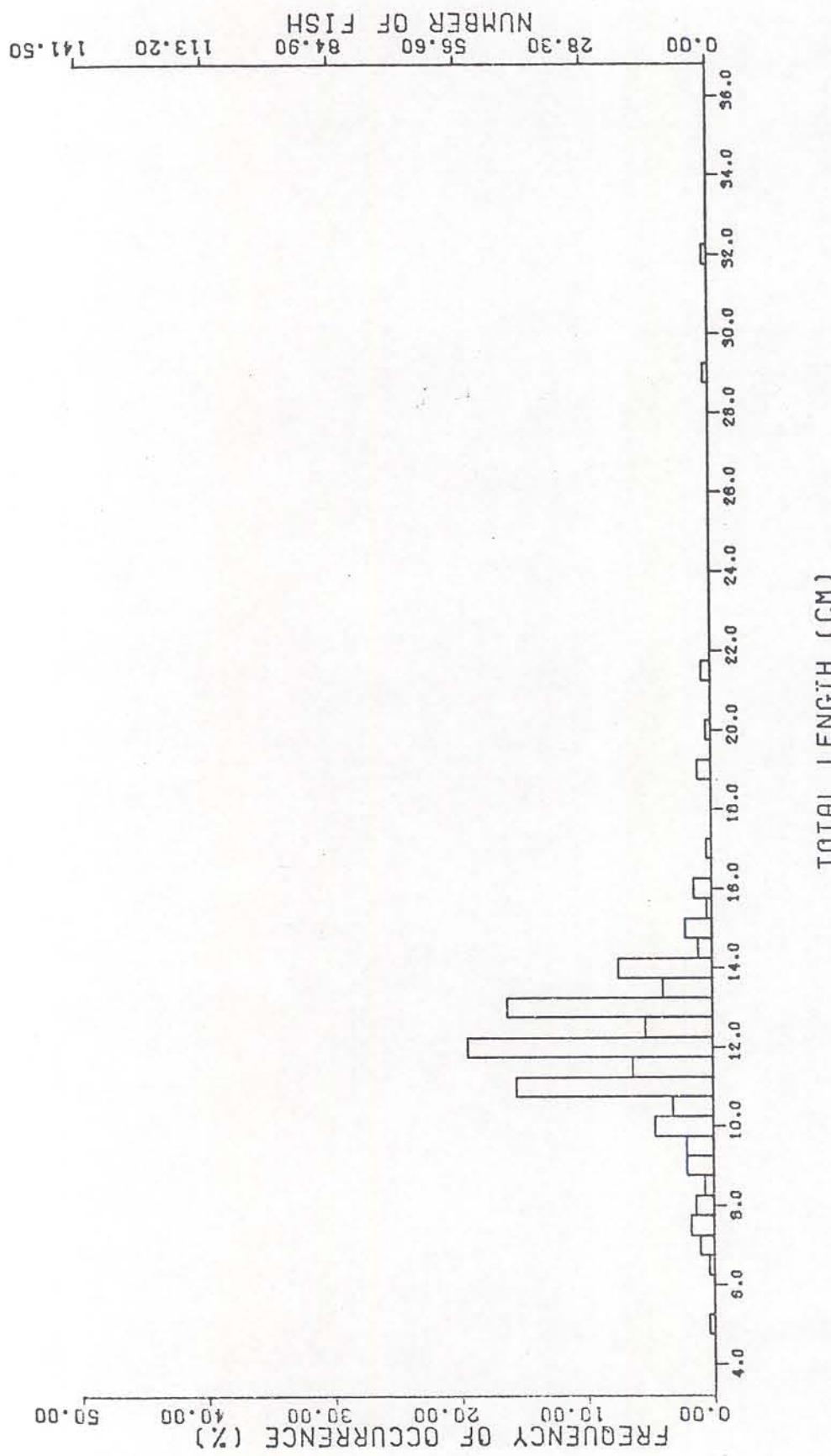


Figure 11. Length frequency distribution of gizzard shad collected from the Dean H. Mitchell Station traveling screens during December 1975.

NALCO ENVIRONMENTAL SCIENCES

GIZZARD SHAD - JANUARY

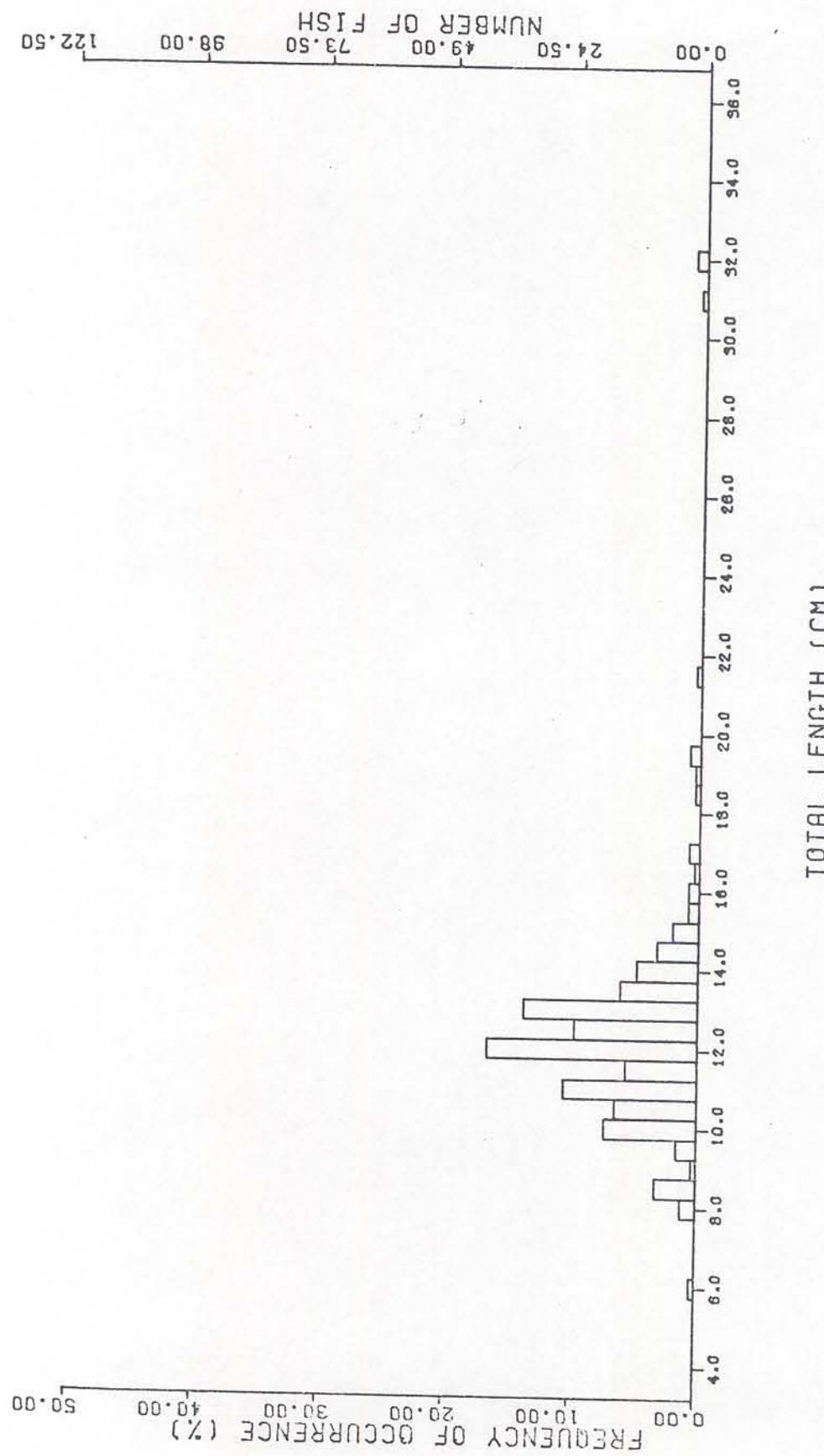


Figure 12. Length frequency distribution of gizzard shad collected from the Dean H. Mitchell Station traveling screens during January 1976.

NALCO ENVIRONMENTAL SCIENCES

Appendix B). Yellow perch were found on the traveling screens only occasionally during other months.

Total estimated losses for July and August were 5.8 kg and 4.3 kg respectively (Table 5). Annual losses of yellow perch were estimated to be 528 or 47.3 kg reflecting 0.3% or 1.2% of the total fish impinged (Table 3).

Length frequency distributions for yellow perch impinged in July and August showed total lengths to range from 10 to 25 cm. The statistical modes for the length measurements made were 18.0 and 16.5 cm for the two months, respectively (Figures 13 and 14).

4. Rainbow smelt

Although smelt were consistently present in all months, the total number estimated for the year (353 individuals or 4 kg) was low and reflected the general depression of the lake-wide smelt population reported for 1975 (p. 41 in Cochran and Kitchel 1976). No markedly high peak occurrence of smelt on the Dean H. Mitchell Station traveling screens was noted, although one had been expected in April-May with the spring spawn. Total numbers and weight of smelt estimated impinged monthly are presented in Tables 4 and 5. Smelt constituted 0.2% numerically and < 0.1% by weight of annual fish losses (Table 3).

Although rainbow smelt were not collected in sufficient numbers to generate histograms, the investigators noted that smelt impinged in spring were adult length (16 cm) while smelt impinged in the fall were young-of-the-year (6-8 cm).

NALCO ENVIRONMENTAL SCIENCES

YELLOW PERCH - JULY

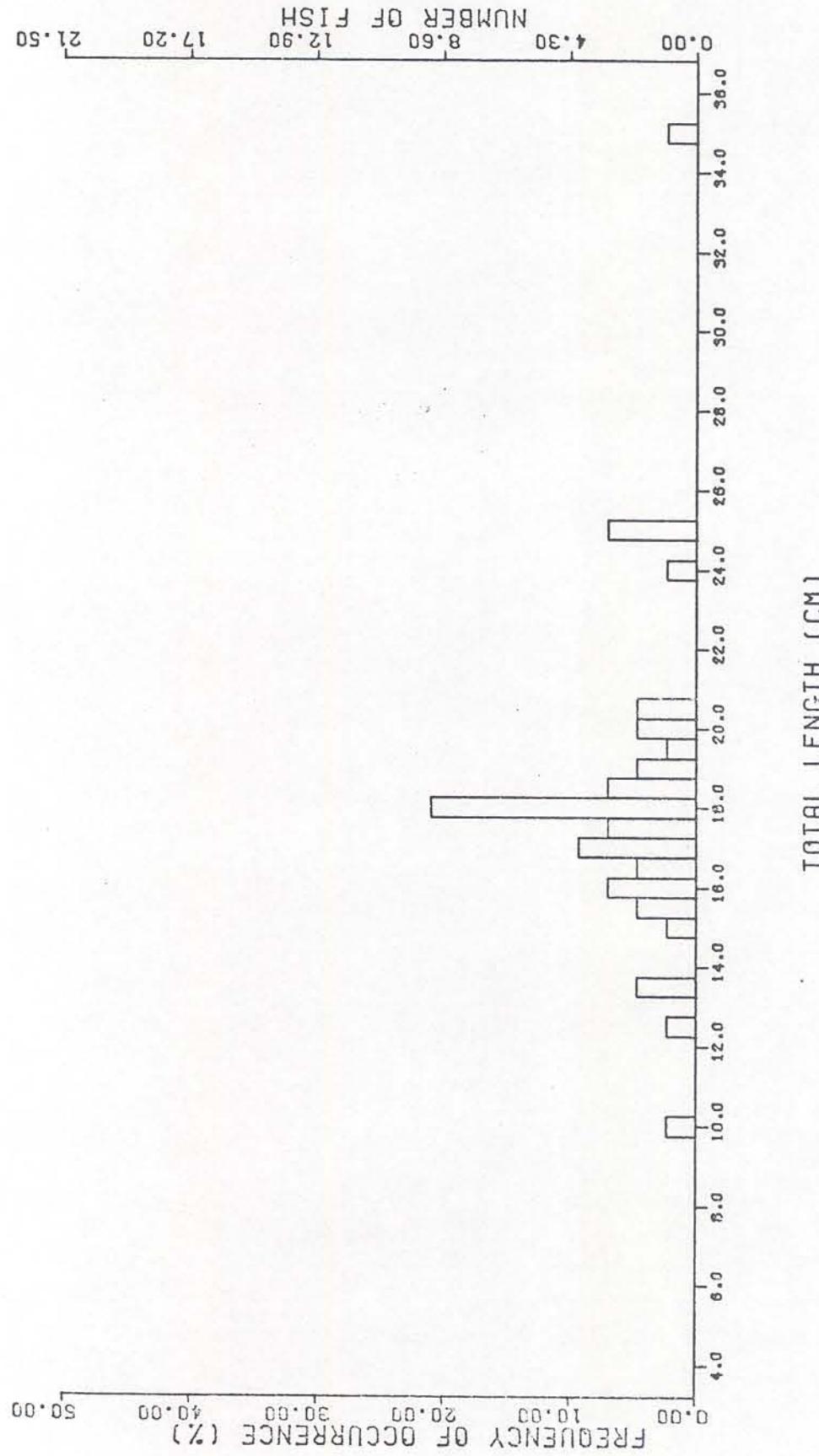


Figure 13.

Length frequency distribution of yellow perch collected from the Dean H. Mitchell Station traveling screens during July 1975.

NALCO ENVIRONMENTAL SCIENCES

YELLOW PERCH - AUGUST

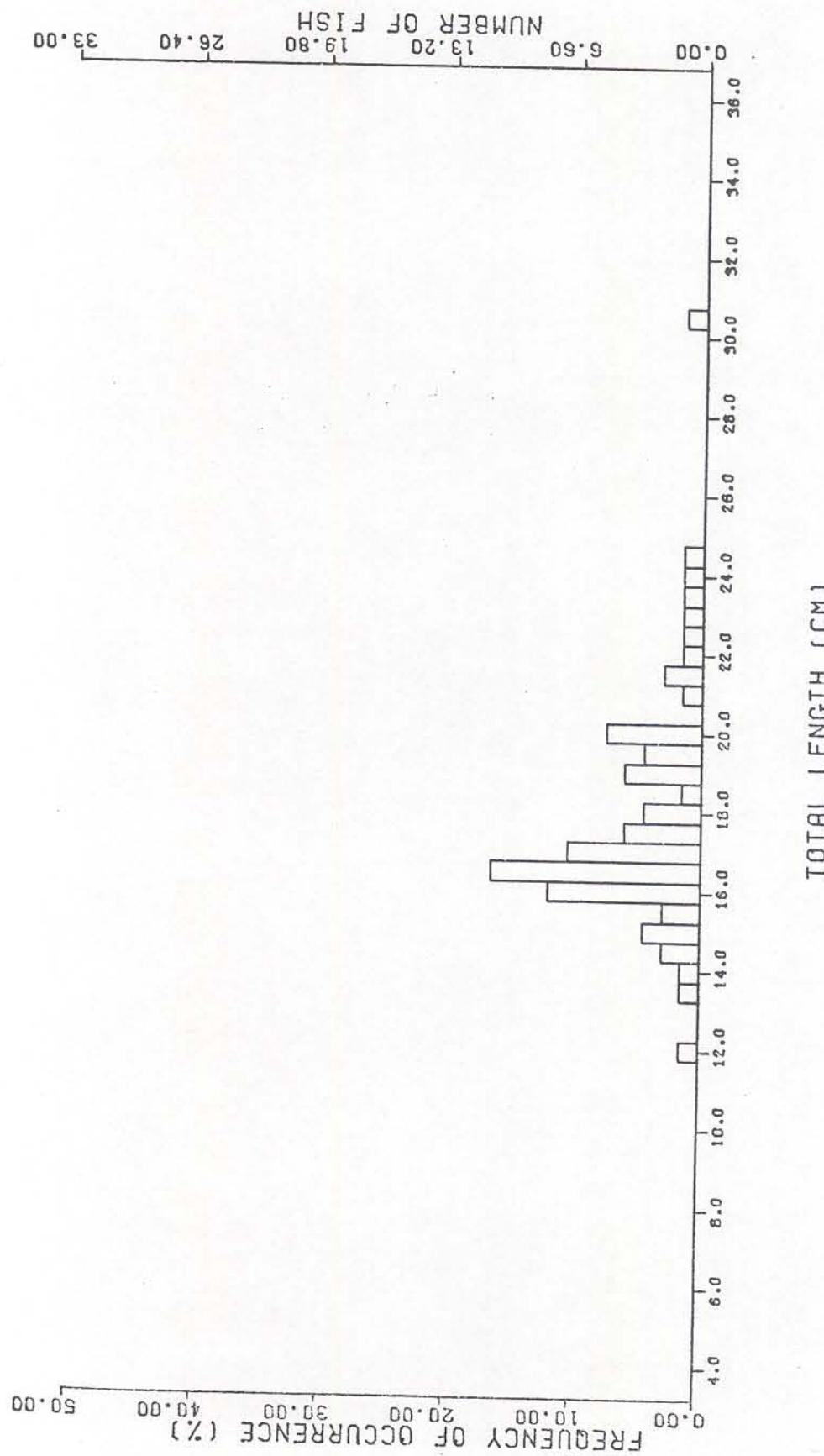


Figure 14. Length frequency distribution of yellow perch collected from the Dean H. Mitchell Station traveling screens during August 1975.

NALCO ENVIRONMENTAL SCIENCES

5. Other Species

Troutperch, slimy sculpin and spottail shiner, although less numerous, were consistently present in monthly impingement collections. Estimated total numbers and weights of each species impinged monthly are presented in Tables 4 and 5. Annual total estimates are given in Table 3.

A total of 14 salmonids of five species (coho and chinook salmon; rainbow, brown and lake trout) were collected reflecting a total estimated annual impingement loss of 56 salmonids (31.6 kg) (Table 3).

Other species occurred infrequently and primarily as one or two individuals. Estimated total numbers and weight of each of these incidental species are presented in Table 3.

6. Comparison with Other Data

Table 6 summarizes impingement data collected by plant personnel during March 1973 to August 1974. Only weights of fish were taken. Comparison with Table 5 for 1975-76 showed similar trends in occurrence of alewife and smelt, although both were more abundant in 1973 than in 1975. Many more yellow perch were also impinged in 1973 than in 1975.

Limnetics (1976) has reviewed the literature on Lake Michigan fish species and has reported biomass estimates for alewife, smelt, yellow perch, slimy sculpin, lake trout and coho salmon for various years. According to the Limnetics report (p.p. II.1-5, 1976) alewife in 1972 were estimated to have a total weight of 1.47×10^9 kg of all age groups, corresponding to

NALCO ENVIRONMENTAL SCIENCES

Table 5 . Total weight (kg) of fish impinged at Dean H. Mitchell Station during 1973 and 1974. (Data provided by Northern Indiana Public Service Company).

Species	Month											Estimated Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
<u>1973</u>												
Alewife	a	235.6	12225.6	2535.0	3385.2	1884.5	648.7	96.3	32.0	20.3	942.6	13207.0 ^b
Carp		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.0	6.6
Minnow		0.8	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.5	1.3	8.3
Yellow Perch		15.1	32.5	123.8	15.3	17.5	0.0	1.1	0.0	0.0	1.8	248.5
Chub		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Smelt		0.0	279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	279.0
<u>1974</u>												
Alewife		892.5	60.6	103.3	509.5	618.2	195.2	475.8	191.1	a	4569.3	
Coho Salmon		0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0			2.7
Smelt		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0			0.1
Yellow Perch		0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.3			1.2
Trout (Lake?)		0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0			1.4

a No data

b Estimated for entire year based on monthly average of available data.

NALCO ENVIRONMENTAL SCIENCES

102.8 kg per acre. Also, during 1973 and 1974, 99.8×10^6 kg of alewife biomass was available to bottom trawls. Using these values as averages, the 1975-1976 impingement of 3833 kg of alewife at Dean H. Mitchell Station reflects a loss to the 1972 average lake-wide alewife population of about 0.0003% and about 0.04% of those near bottom. Commercial catch of alewife data from 1956 through 1974 showed that, in 1974, Indiana took no alewife (Table 7) while Michigan and Wisconsin harvested a total of 21×10^6 kilograms of alewife, representing 23% of the 1974 bottom population with most fish taken in northern Green Bay (p.p. II. 1-9 in Limnetics 1976). The numbers of alewives impinged at Mitchell Station would be about 0.018% of that catch.

Limnetics (p.p. II. 2-8 1976) also reported U. S. Department of the Interior estimates of 13.60×10^6 and 14.06×10^6 kg of rainbow smelt available to bottom trawls. The estimates were conservative in that they reflect only the benthic level fraction of the smelt population. Nonetheless, the few smelt impinged at Mitchell Station both in 1973-74 and 1975-76 (279 kg and 4 kg, respectively; Tables 3 and 6) reflected such small percentages of these estimated as to be negligible (< 0.0001%). This is especially true in view of the commercial catch of 36000 kg of smelt in Indiana in 1975 (Table 7) and 740,000 kg in 1974 in all states bordering on Lake Michigan (Table 8). As with alewives, the preponderance of the latter catch was taken from Northern Green Bay (p.p. II. 2-9 in Limnetics, 1976).

NALCO ENVIRONMENTAL SCIENCES

Table 7.

Commercial fish catch from Indiana portion of
Lake Michigan.

Species	Reported Catch (pounds)				
	1970	1971	1972	1973	1974
Lake trout	8,079	25,790	13,903	8,400	8,003
Brown trout				9	72
Steelhead					13
Coho	3,227	5,083	1,157	218	12
Chinook				9	4
Chubs	74,390	28,489	38,262	35,668	4,401
Whitefish	3,816	22,636	999	868	111
Suckers	31,698	208,984	17,659	12,255	8,013
Yellow perch	205,764	333,850	340,607	257,883	176,338
Smelt	239	43,642	9,466	-a	16,418
Total Production	334,600	784,855	428,373	352,000	213,385

a Error on printout.

NALCO ENVIRONMENTAL SCIENCES

Table 8. Estimated total number and weight of Lake Michigan fish impinged at
Dean H. Mitchell Station, May 1975 through April 1976 and total Lake
Michigan commercial production, sport landings and plantings in 1974.

Species	Estimated Impinged Number	Percent Removed	Commercial Production (kg)		Sport Landings (Number)		Plantings (Number) All States, 1974
			All States, 1974	All States, 1974	All States, 1974	All States, 1974	
Alewife	152,965	3833	0.023	20,747,148	a		
Rainbow smelt	353	4	0.003	152,955			
Gizzard shad	3,087	53					
Yellow perch	528	47	0.012	379,500	1601b		
Troutperch	104	1	<0.001				
Coho salmon	8	4	<0.001				
Chinook salmon	4	11	<0.001				
Rainbow trout	16	10	<0.001				
Lake trout	12	4	<0.001				
Brown trout	16	2	<0.001				
Slimy sculpin	134	2	0				
Carp	16	32	<0.001	1,474,455			

a No data

b Wisconsin census only, 1974, kg.

NALCO ENVIRONMENTAL SCIENCES

Biomass and commercial catch estimates were not available for gizzard shad.

Commercial catch of yellow perch totalled 388,000 kg in Indiana waters and 1.8×10^6 kg in all states in 1974 (Tables 7 and 8). The 47 kg lost to impingement at Dean H. Mitchell Station constitutes a minimal loss compared to these reported commercial catch data. Similarly, total sport landings in 1973 of 191,000 kg and 98000 kg in eastern Lake Michigan waters were large compared to the 47 kg impingement loss. Limnetics (p.p. II. 4-7, 1976) noted that these yellow perch landings were incidental catches since most of the fishermen were seeking salmonids.

Biomass of slimy sculpin was conservatively estimated by the U. S. Department of Interior as reported by Limnetics (p.p. II. 5-3, 1976). Based on bottom trawl data, at least 1.09×10^6 kg and 1.7×10^6 kg of slimy sculpin were present in Lake Michigan in 1973 and 1974, respectively. Again, with only 134 (1.7 kg, Table 3) estimated as impinged during 1975-76, the impact of the loss of this weight of slimy sculpin at Dean H. Mitchell Station traveling screens would be small (< 0.0001%).

Limnetics (p.p. II. 10-15, 1976) reported a biomass estimate of lake trout for 1972 of 2.245×10^6 kg of age group II or older. Twelve lake trout (3.8 kg) (Table 3) were estimated impinged on Dean H. Mitchell Station traveling screens. Coho salmon biomass estimates for 1972 varied between 1.45×10^6 kg depending on month (p.p. II. 12-15 Limnetics, 1976). Eight coho salmon (4.3 kg) (Table 3) were estimated impinged. Sport

NALCO ENVIRONMENTAL SCIENCES

catches of the five salmonid species combined were 413,000 fish for 1974 (Table 8). Totals estimated impinged at Mitchell Station were 56 of all species or 0.0014% of the estimated sport landings for 1974. Commercial catch of all five salmonid species in Indiana in 1974 was 8104 fish (Table 7). Again impingement losses at Dean H. Mitchell Station are minimal in relation to these production figures.

There is an extensive sport fishery in the vicinity of Mitchell Station. Creel census data for 1972, indicated that the East Chicago area, which includes the Mitchell Station area, was the hot-spot for spring salmonid fishing in Indiana waters of Lake Michigan (Koch 1973). Coho salmon was the most commonly caught fish in April and May with rainbow trout, brown trout, lake trout and chinook salmon contributing in that order. Salmonid fishing in the vicinity of Mitchell Station, as with other local inshore areas, tapers off in summer. In fall, sport fishing activity again increases. However, both the number of fishermen and their success is less than in the spring.

Other sport fishing activity in the vicinity of the Mitchell Station includes smelt fishing by dip net in April and May, a limited amount of yellow perch fishing in summer, and carp fishing within the discharge canal. Both shore and boat fishermen are common in the discharge area in spring and fall. Also, NIPSCO provides access for sportsmen to pass through the Station property to reach desirable shore fishing areas. The nearest public boat launching facility is at Jeorse Park, located just two miles west of the Mitchell Station.

Based on the data gathered on fish impingement at Dean H. Mitchell Station from April 1973 through August 1974 and from May 1975 through April 1976 the impact on lakewide or local fish populations is negligible. The presence of the stone block intake crib, intake canal and electrified fish screens afford some reduction in the numbers of fish impinged.

C. Egg and Larvae Entrainment

Five species of fish eggs and larvae were identified from entrainment samples at Dean H. Mitchell Station from 3 May through 30 December 1975. The five species were smelt, alewife, carp, troutperch and slimy sculpin (Table 9). All sample data are presented by species in Appendix C, Table C-1 through C-124.

Daily mean densities of the eggs of four of the five species are presented in Figure 15. Larvae mean daily densities of three species are shown in Figure 16.

1. Rainbow Smelt

a. Eggs

Rainbow smelt eggs were collected only from 3 May through 20 May (Figure 17) (Tables C-1 through C-5, Appendix C). The sampling program started slightly later than the usual period of maximum occurrence of smelt eggs so that entrainment estimates were probably low. Mean sample densities (based on four replicates) ranged from 0.000 m^{-3} to 0.086 m^{-3} on 12 May at 0730 hrs (Table C-3, Appendix C). Daily mean densities (based on three samplings per day) of smelt eggs ranged from 0.031 m^{-3} on 11-12 May to 0.000 m^{-3} by 23-24 May (Tables C-3 through C-6, Appendix C).

NALCO ENVIRONMENTAL SCIENCES

Table 9.

Peak collection periods of eggs and larvae for fish species at Dean H. Mitchell Station, May through December 1975.

		Months								
		May	June	July	Aug	Sep	Oct	Nov	Dec	
Smelt	eggs	X								
	larvae	X	X	X	X	X				
Alewife	eggs	X	X	X	X					
	larvae	X	X	X	X	X				
Carp	eggs	X	X	X	X					
	larvae	X	X	X						
Trout-perch	eggs					X	X	X		
	larvae					X	X	X	X	
Slimy sculpin	eggs				X					
	larvae				X					

NALCO ENVIRONMENTAL SCIENCES

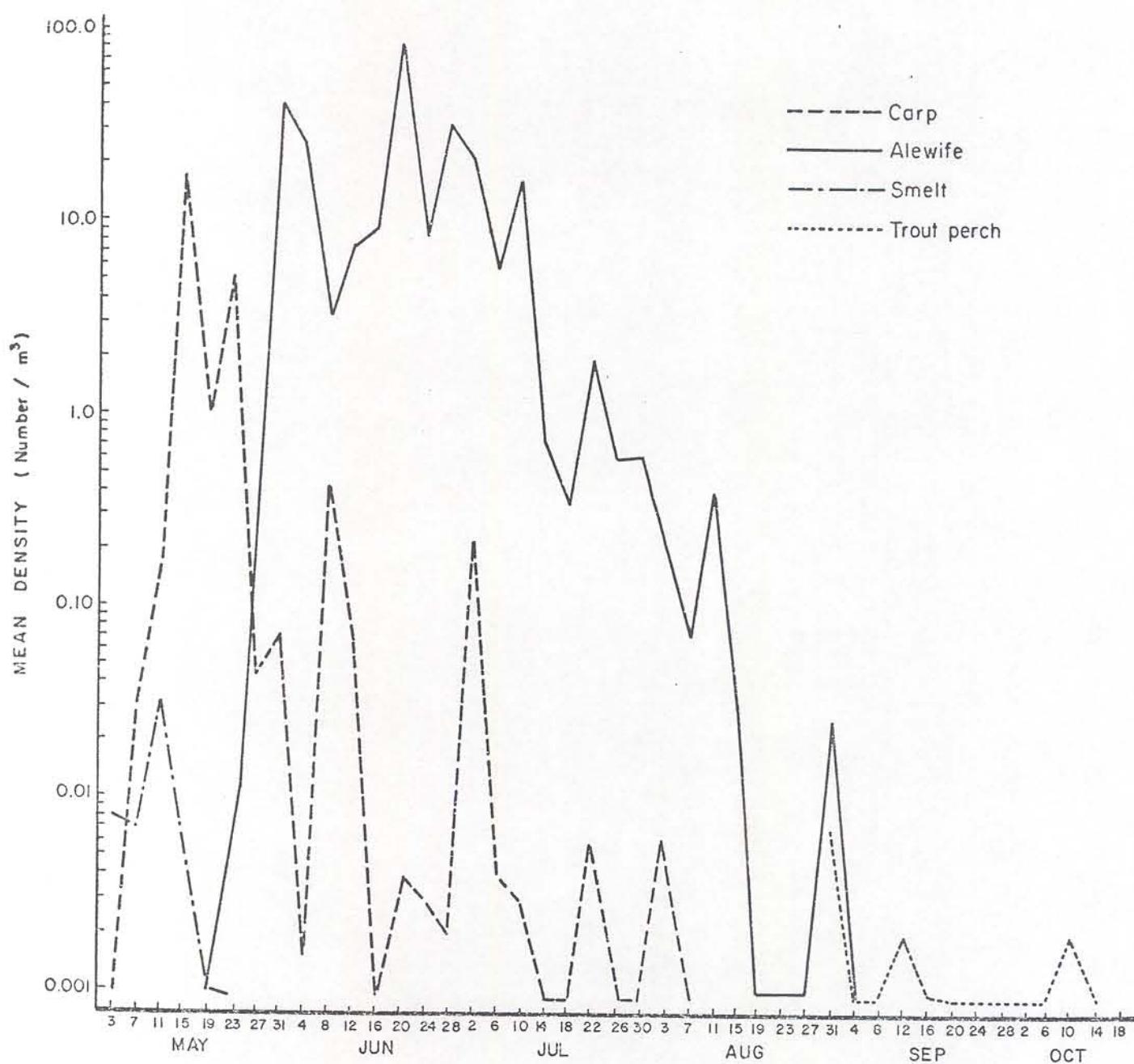


Figure 15. Mean daily density (number/m^3) of four species of Lake Michigan fish eggs collected by plankton net from the Dean H. Mitchell Station discharge canal, May through December 1975.

NALCO ENVIRONMENTAL SCIENCES

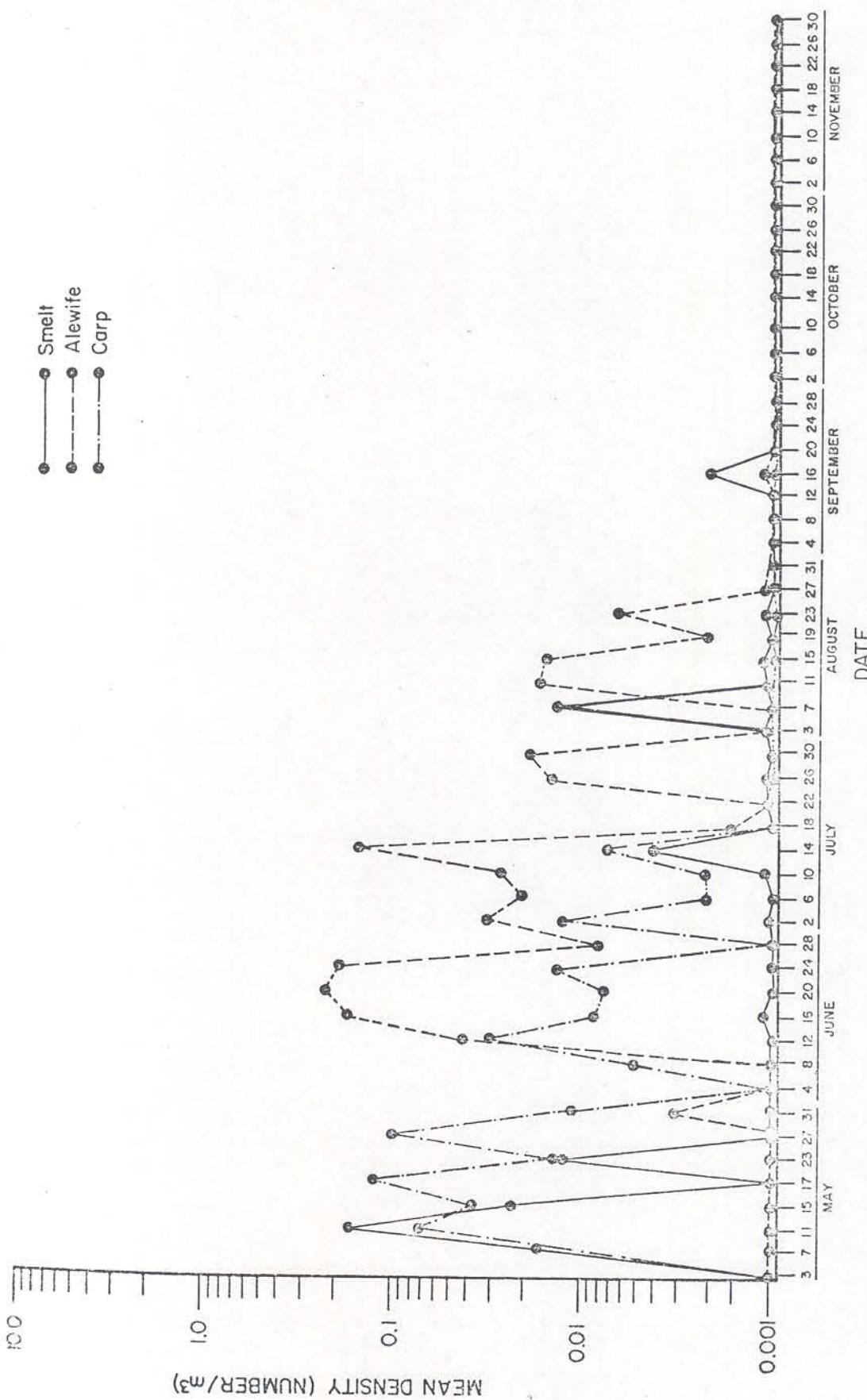


Figure 16. Mean daily density (number/m³) of three species of Lake Michigan fish larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, May through December 1975.

NALCO ENVIRONMENTAL SCIENCES

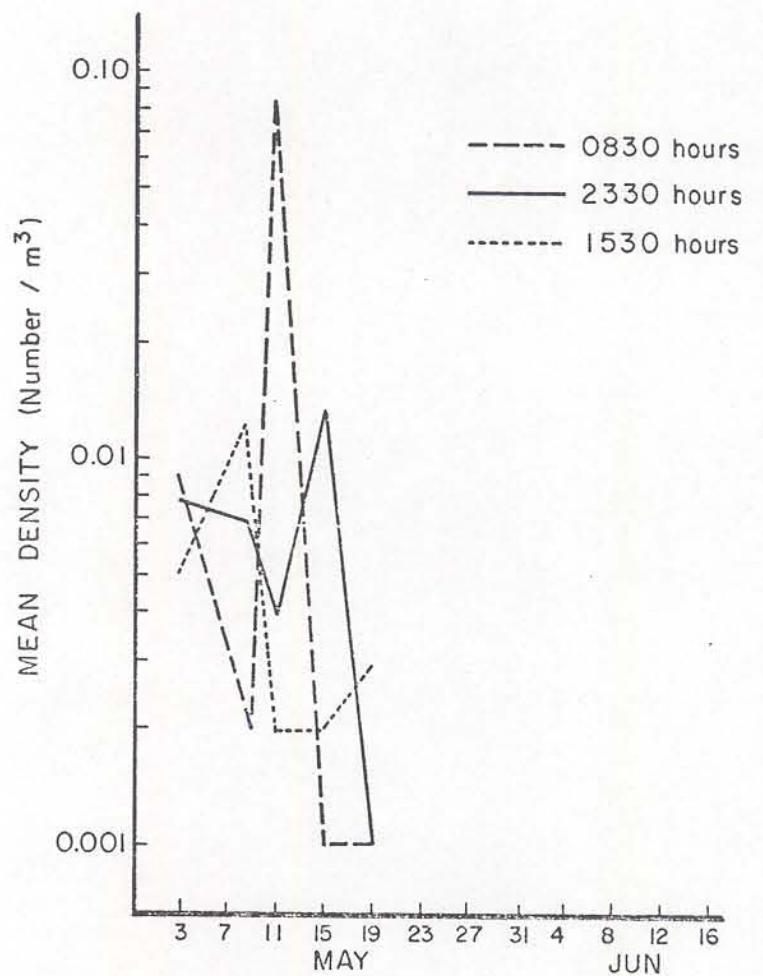


Figure 17. Mean density (number/ m^3) of rainbow smelt eggs collected by plankton net at various times of day from the discharge canal at Dean H. Mitchell Station during May 1975.

NALCO ENVIRONMENTAL SCIENCES

A total of only 58 smelt eggs were collected. As a result, little can be said about differences in day/night abundance. Mean monthly entrainment density (based on eight sample days) for May was 0.006 smelt eggs m^{-3} .

An estimated 251,000 smelt eggs were entrained during May under estimated 50% flow conditions while an estimated 452,000 would be entrained at full flow (Table 10). Cima et al. (p. 142, 1976) reported a mean fecundity of 35.5×10^3 eggs per female smelt. The estimated total numbers of smelt eggs entrained thus represented the egg production of seven and 14 spawning females at observed and capacity flow, respectively. It should be noted that a lakewide depression of the smelt population has been reported for Lake Michigan 1975-76 (p. 76 in Cochran and Kitchel, 1976), and that estimated numbers entrained may be fewer than typical.

b. Larvae

Smelt larvae appeared in entrainment samples on the first day of sampling (3 May) and were continually present through 23-24 May (Figure 18) (Tables C-1 through C-6, Appendix C). Larval smelt occurrence was infrequent during June and July (Tables C-7 through C-24, Appendix C). In early August, smelt larvae again appeared briefly in relatively large numbers (Table C-25, Appendix C). After mid-August, no smelt larvae were taken in plankton net entrainment samples (Figure 18). Juvenile smelt with total lengths of 6-8 cm appeared later on the traveling screens.

NALCO ENVIRONMENTAL SCIENCES

Table 10. Estimated monthly total numbers^a of rainbow smelt (*Osmerus mordax*) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975.

Month	Average Observed Flow		Maximum Flow	
	Eggs	Larvae	Eggs	Larvae
May	251,000	1,050,000	452,000	1,889,000
June	0	7,000	0	10,000
July	0	37,000	0	47,000
August	0	78,000	0	94,000
September	0	13,000	0	16,000
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
Total	251,000	1,185,000	452,000	2,056,000

^a Based on discharge samples only.

NALCO ENVIRONMENTAL SCIENCES

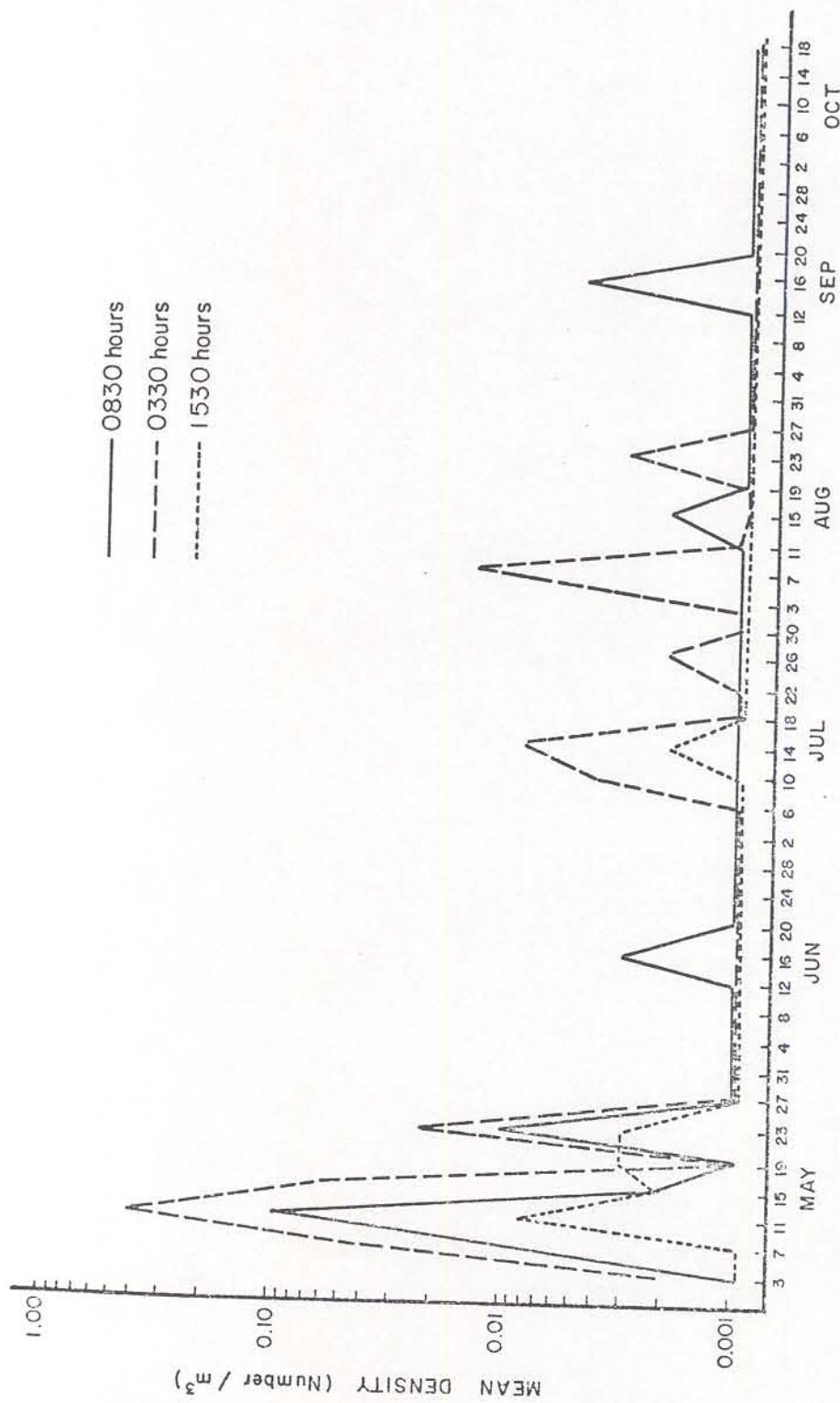


Figure 18. Mean density (number/m³) of rainbow smelt larvae collected by plankton net at various times of day from the discharge canal at Dean H. Mitchell Station, May through October 1975.

NALCO ENVIRONMENTAL SCIENCES

The highest average sample density was 0.385 m^{-3} at 2330 hrs on 11 May (Table C-3, Appendix C). A second peak sample density (average) of 0.053 m^{-3} was seen at 2400 hrs on 7 August when larger larvae were being entrained (Table C-27, Appendix C). The highest mean daily density (0.164 m^{-3}) was observed on 11-12 May (Table C-3, Appendix C). Mean monthly densities of 0.027 m^{-3} , 0.0001 m^{-3} , 0.0009 m^{-3} and 0.0004 m^{-3} were noted for smelt larvae in May, June, July and August, respectively.

Based on mean 8-hour sample densities, total numbers of smelt larvae entrained were estimated to be one million, 7000, 37000, 78000 and 13000 for May through September, respectively (Table 10). Total for the year was estimated to be 1.185×10^6 at average flow (Table 10). Extrapolation of these estimates indicate that 2.056×10^6 smelt larvae are entrained annually at capacity flow (Table 10). The estimates may be conservatively low because some larvae may have been entrained in April, before the sampling program started.

Rupp (p. 160, 1965) found that 1.065% of the potential egg production of smelt survived to the larval stage at a variety of lake and stream spawning sites in Maine. The loss of larvae at Mitchell Station (utilizing the 1.065% survival rate determined by Rupp) was equivalent to the larval production of between 3100 and 5400 adult female smelt.

A total of 269 smelt larvae were collected in May. The mode of total length measurements of these was 5.1-5.5 mm, and the total length ranged from 3.1 mm to 7.0 mm (Figure 19).

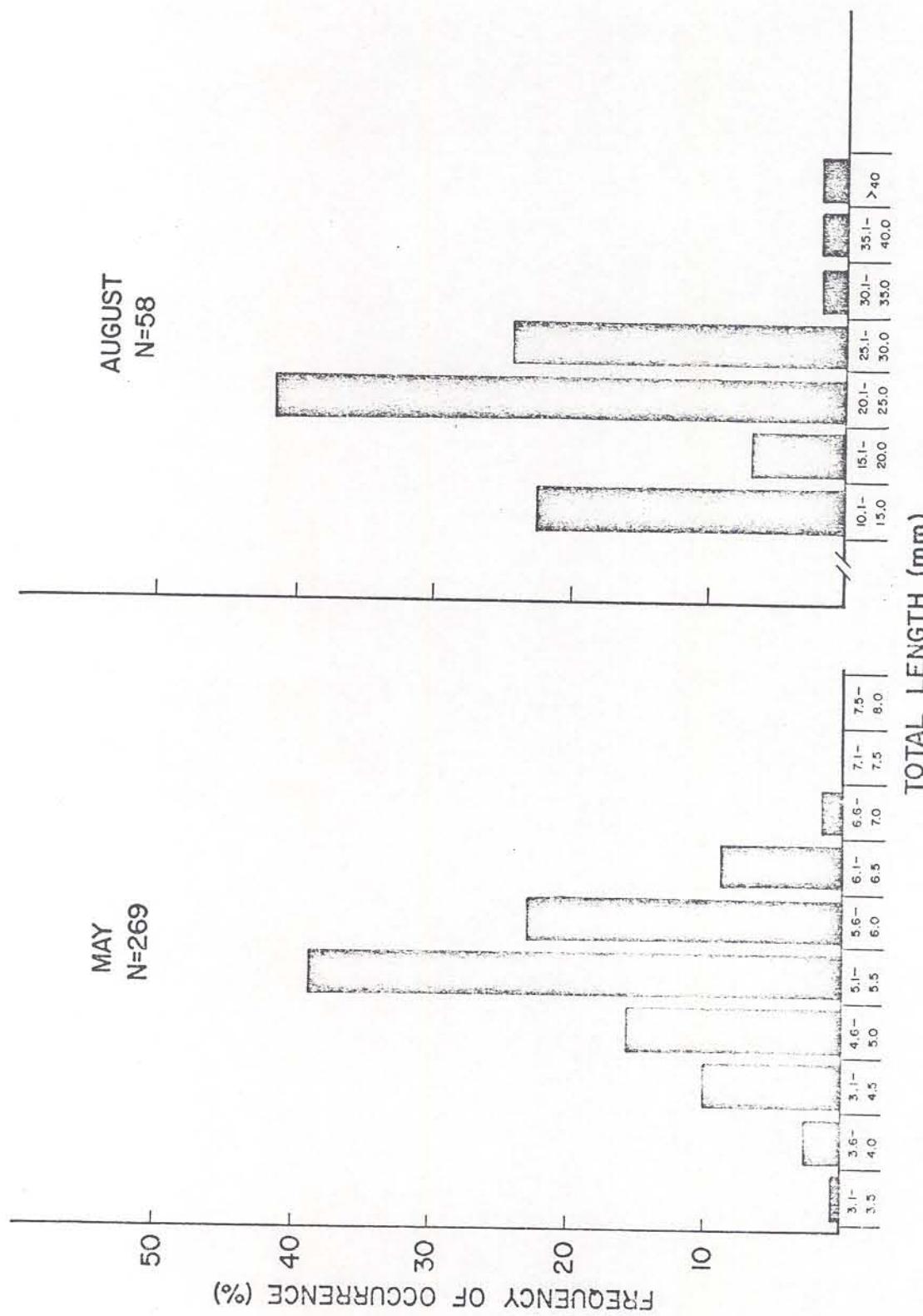


Figure 19. Length frequency distribution of larval smelt collected by plankton net from the intake and discharge canals at Dean H. Mitchell Station during May and August 1975.

NALCO ENVIRONMENTAL SCIENCES

Total length frequency distribution of 58 smelt larvae collected in August was bi-modal at 10.1-15.0 mm and 20.1-25.0 mm with an overall range of 10.1 mm to more than 40 mm total length (Figure 19). Entrained larvae, therefore, reflected the growth that would be expected in the lake population.

2. Alewife

a. Eggs

Alewife eggs were first collected in entrainment samples on 23-24 May (Tables C-39 through C-44, Appendix C). These eggs continued to be collected during June, July and August but were not collected after 1 September (Tables C-45 through C-77, Appendix C). Highest single replicate density was 278.8 m^{-3} at 2330 hrs on 20 June (Table C-51, Appendix C). Maximum average density for an 8-hour sampling period was 205.3 m^{-3} at the same time on the same date. Greatest mean daily density of alewife eggs was 79.9 m^{-3} again for the same date (Table C-51, Appendix C). Mean monthly densities were 5.040 m^{-3} , 23.583 m^{-3} , 5.232 m^{-3} and 0.071 m^{-3} for May, June, July and August respectively.

Alewife egg densities were generally greater during the evening (2330 hrs). Densities were less in the morning (0730 hrs) with early afternoon (1430 hrs) samples indicating the lowest densities of alewife eggs (Figure 20). Greater evening densities reflects the generally reported night spawning time preference among alewives (p. 136 in Otto 1975).

Mean alewife egg densities were higher in discharge canal samples than in intake canal samples for the few

NALCO ENVIRONMENTAL SCIENCES

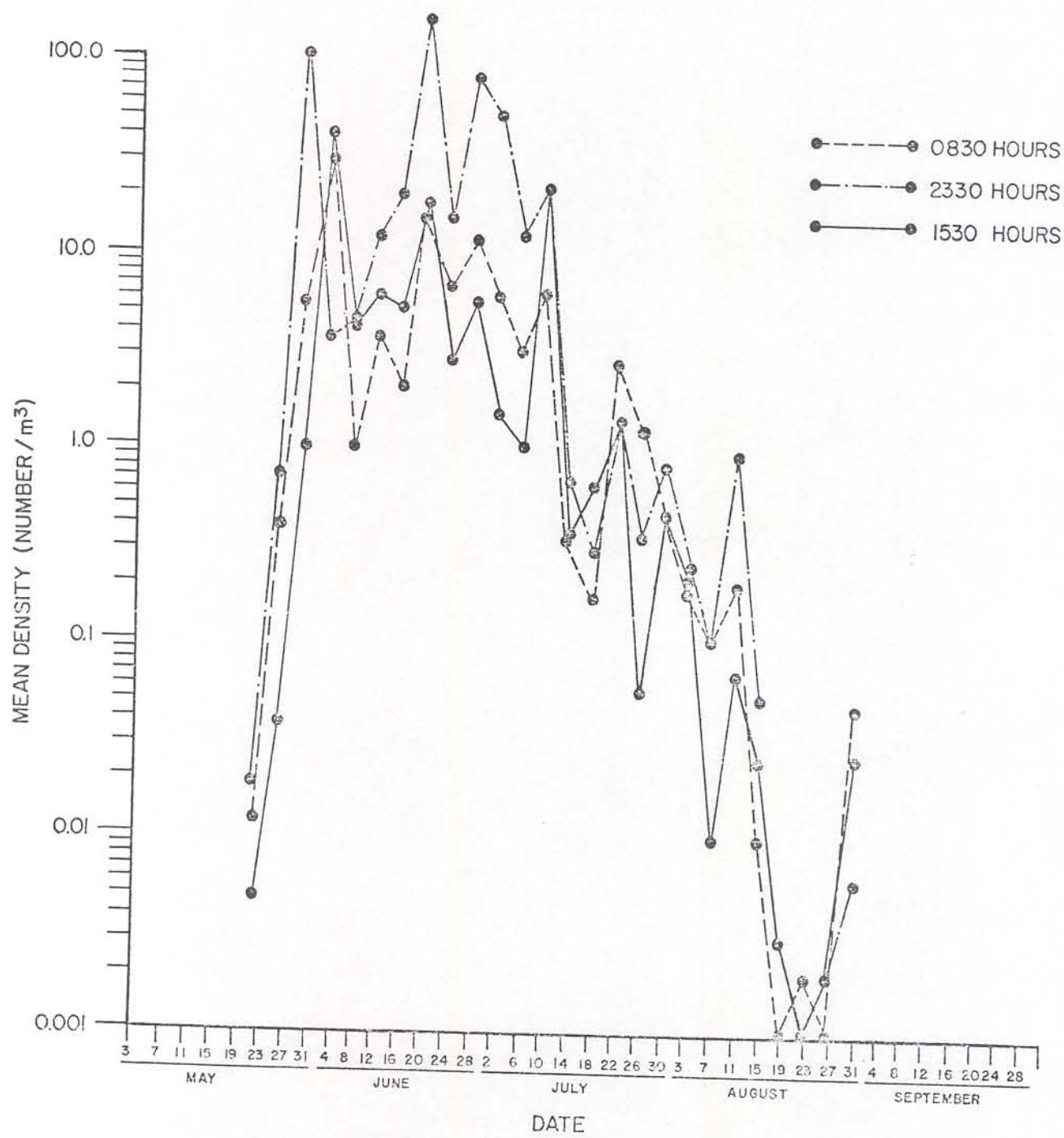


Figure 20. Mean density (number/m³) of alewife eggs collected by plankton net at various times of day from the discharge canal at Dean H. Mitchell Station, May through December 1975.

NALCO ENVIRONMENTAL SCIENCES

times when abundance was sufficiently high to make comparisons (Figure 21). Greater density of eggs in the discharge canal was attributed to discharge canal spawning and/or release of eggs by impinged females in ripe condition.

Based on mean 8-hour sample densities, estimated total numbers of alewife eggs entrained monthly ranged from 4×10^6 in August to 1.1×10^9 in June at average observed flow (Table 11). At capacity flow, estimated totals entrained would range from 5×10^6 to 1.6×10^9 . Annual estimated entrained losses were 1.572×10^9 to 2.355×10^9 at average and capacity flow, respectively (Table 11). These losses would represent the egg production of 150,000 to 224,000 spawning females (p. 87 Cima et al., 1976). During the period May through August 1975, a total of 111,000 adult alewives were impinged of which 55000 were female.

b. Larvae

Alewife larvae first appeared in entrainment samples on 31 May but did not occur again until 12 June (Tables C-39 through C-49, Appendix C). They were present almost continuously through the remainder June and July (Table C-50 through C-62, Appendix C). They were absent during a two week period in August, but recurred in late August. The last alewife larva was taken (Tables C-63 through C-77, Appendix C) on 20 September.

Highest average sample density occurred at 2330 hrs on 20 June when a mean density of 0.572 m^{-3} was seen (Table C-51, Appendix C). Peak mean daily density of 0.217 m^{-3} larval alewife (Table C-51, Appendix C) was observed on 20-21 June.

NALCO ENVIRONMENTAL SCIENCES

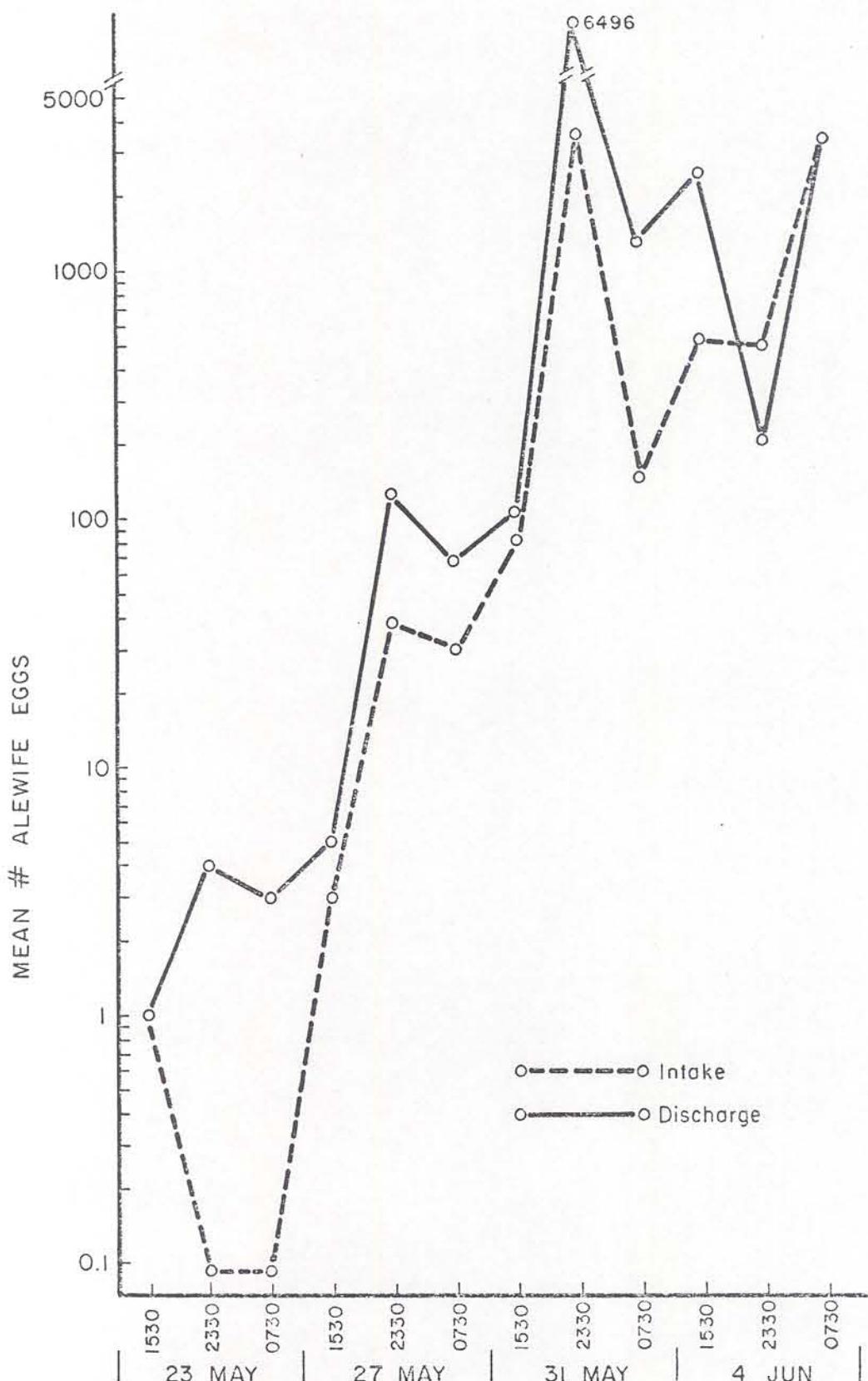


Figure 21. Mean densities (number/m³) of alewife eggs collected from the intake and discharge canals at Dean H. Mitchell Station, May-June 1975.

NALCO ENVIRONMENTAL SCIENCES

Table 11. Estimated monthly total numbers^a of alewife (Alosa pseudoharengus) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975.

Month	Average Observed Flow		Maximum Flow	
	Eggs	Larvae	Eggs	Larvae
May	126,014,000	15,000	352,523,000	26,000
June	1,120,243,000	4,671,000	1,596,417,000	6,657,000
July	322,148,000	1,840,000	401,500,000	2,294,000
August	4,065,000	224,000	4,912,000	271,000
September	0	15,000	0	19,000
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
Total	1,572,470,000	6,765,000	2,355,352,000	9,267,000

^a Based on discharge samples only.

NALCO ENVIRONMENTAL SCIENCES

Smaller abundance peaks were observed on 14-15 July (0.150 m^{-3} , Table C-57, Appendix C) and 15-16 August (0.093 m^{-3} , Table C-68, Appendix C). Average monthly densities of alewife larvae were 0.0004 m^{-3} , 0.098 m^{-3} , 0.030 m^{-3} and 0.012 m^{-3} for May, June, July and August respectively.

Based on mean 8-hour sampling period density estimates, total numbers of alewife entrained annually were 6.765×10^6 at average observed flow and 9.267×10^6 at capacity flow with maximum numbers entrained in June and July (Table 11).

The total lengths of 469 alewife larvae collected in June and 340 collected in July ranged from 1.6 to 10.0 mm (Figures 22 and 23). Length frequency distributions indicate a statistical mode length of approximately 3.5 mm. These were all primarily newly hatched larvae. Length frequency distribution of 166 alewife larvae collected in August showed total lengths to range from less than 10 mm to 35.0 mm (Figure 24) with a mode of 25.1 - 30.0 mm. Therefore, the alewife larvae collected in August reflected the normal growth of these larvae from hatching. The similarity of the distributions in June and July is interesting in that the July larvae did not show an intermediate length between June and August. Also, most of the entrained larvae in June and July were of lengths indicative of organisms newly-hatched (3.5 mm). It is possible that many of these newly hatched larvae came from eggs that had been spawned in quiet water areas of the intake canal and that they were entrained almost immediately upon hatching. The small size of these larvae however, may reflect a greater

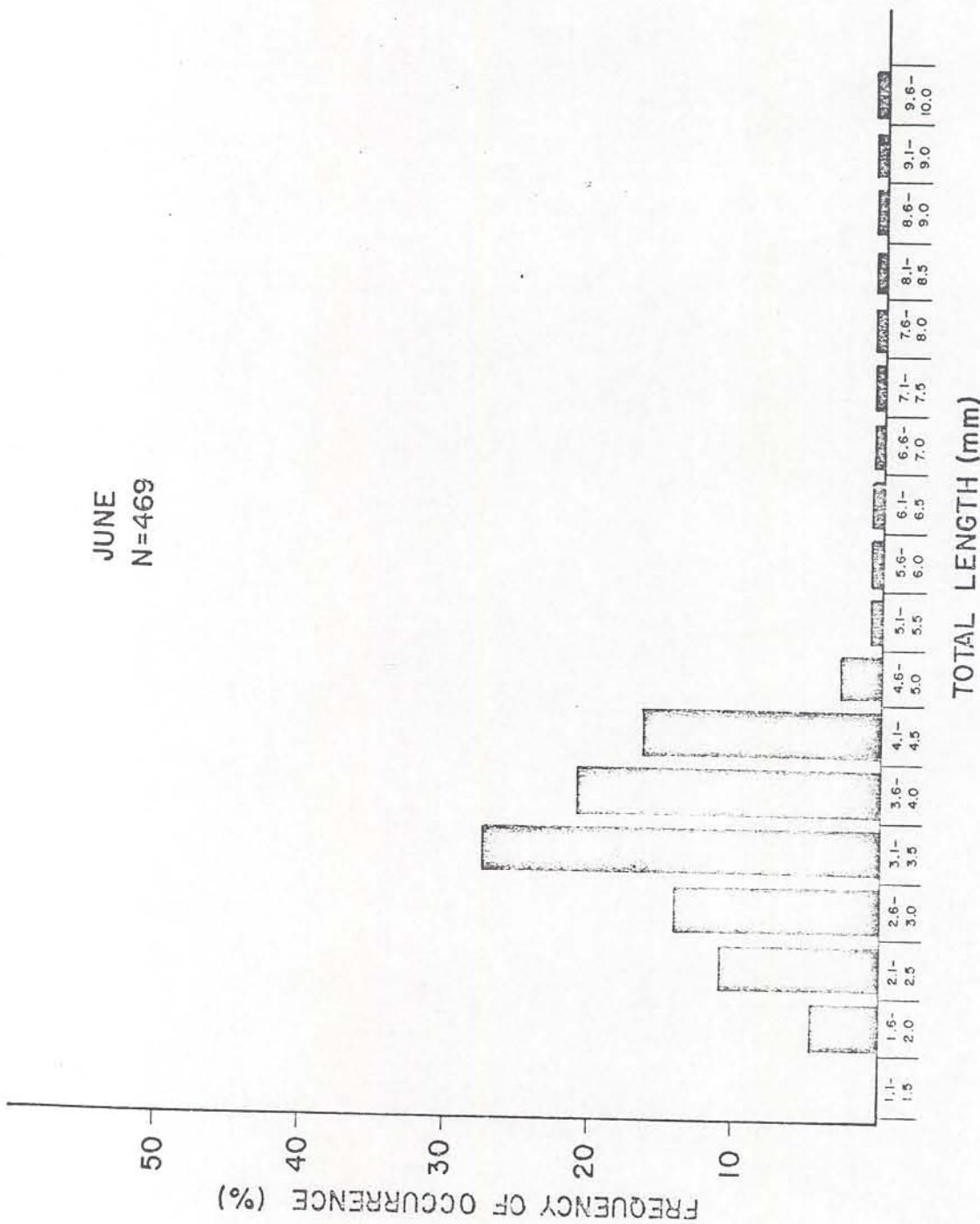
JUNE
N=469

Figure 22. Length frequency distribution of larval alewife collected by plankton net at Dean H. Mitchell Station, June 1975

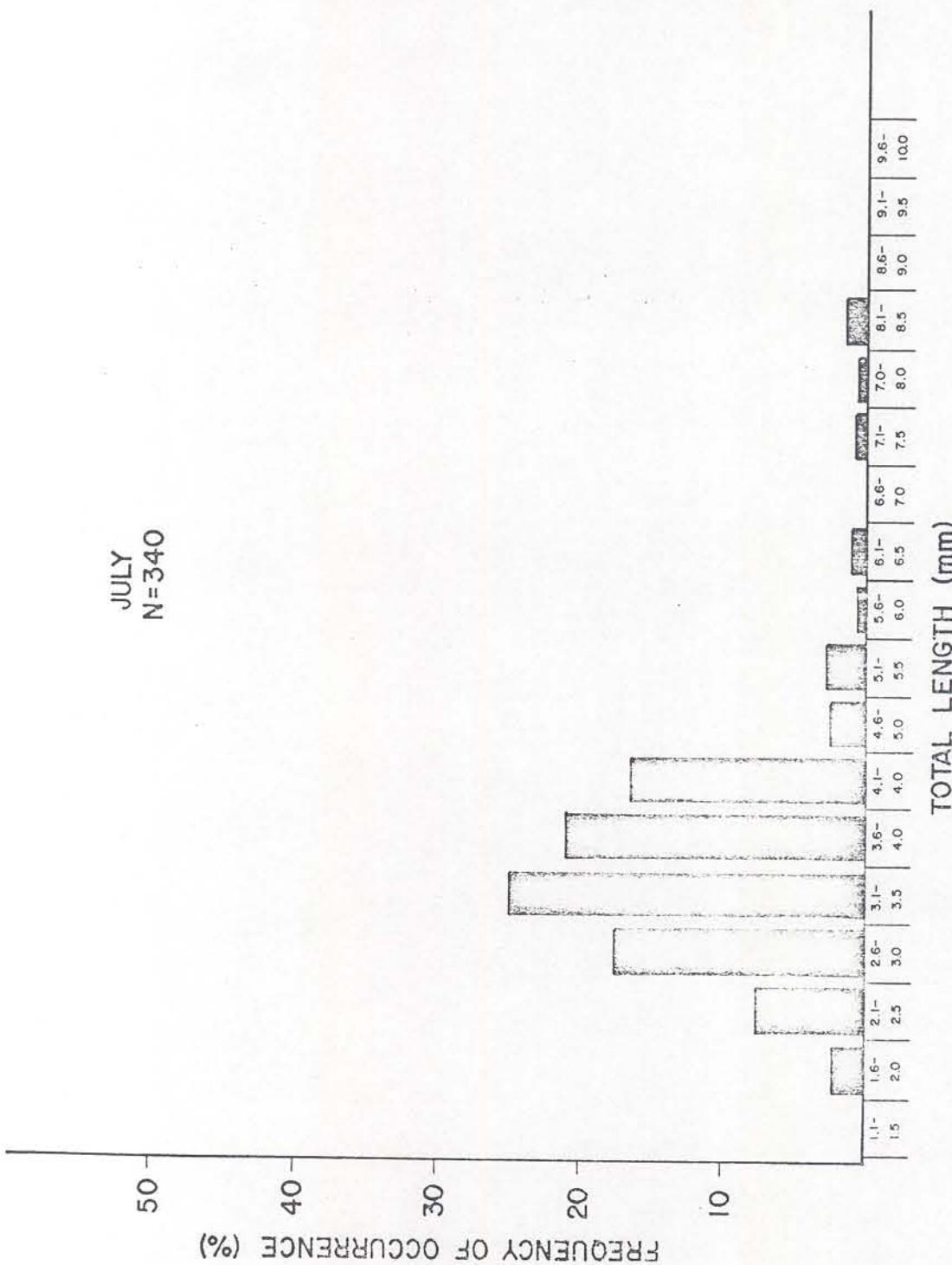


Figure 23. Length frequency distribution of larval alewife collected by plankton net at Dean H. Mitchell Station, July 1975.

NALCO ENVIRONMENTAL SCIENCES

AUGUST
N=166

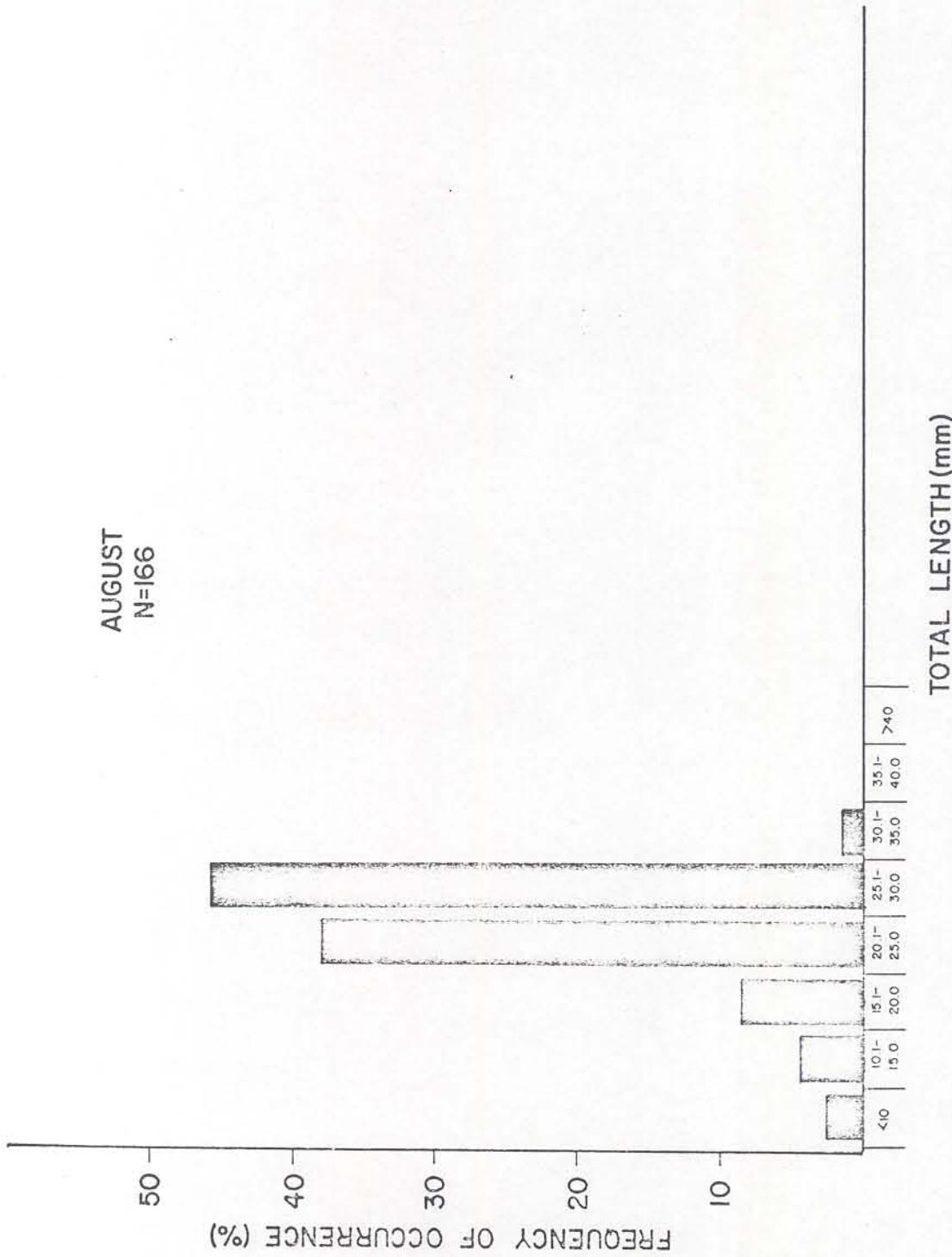


Figure 24. Length frequency distribution of larval alewife collected by plankton net at Dean H. Mitchell Station, August 1975.

NALCO ENVIRONMENTAL SCIENCES

susceptibility of the small larvae to entrainment with larger larvae capable of avoiding intake currents.

Intake and discharge canal samples were inadequate to make comparisons of alewife larval abundance.

During the June-July periods of peak abundance alewife larval density was usually greatest in the samples collected at 2330 hrs (Figure 25) suggesting night at the period of greatest activity of these larvae.

3. Carp

a. Eggs

Carp eggs were present in entrainment samples from the first day of sampling (3 May 1975) (Table C-78, Appendix C). They continued to be present through May to mid-June (Tables C-79 through C-89, Appendix C). Their occurrence was then infrequent with the exception of a minor increase in density on 2-3 July (Tables C-93 through C-102, Appendix C). The last carp eggs were taken in entrainment samples on 3-4 August 1975 (Table C-102, Appendix C).

Highest mean sample densities were 52.854 m^{-3} of carp eggs on 16 May (0715 hrs) and 14.813 m^{-3} on 24 May (0715 hrs) (Tables C-81 and C-83, Appendix C). Maximum average daily density was 17.60 m^{-3} on 15-16 May followed by 4.944 m^{-3} 23-24 May (Table C-81 and C-83, Appendix C). Mean monthly densities were 2.982 m^{-3} , 0.078 m^{-3} and 0.026 m^{-3} for May, June and July respectively.

Based on average densities for 8-hour sampling periods, total numbers of carp eggs entrained were estimated to be

NALCO ENVIRONMENTAL SCIENCES

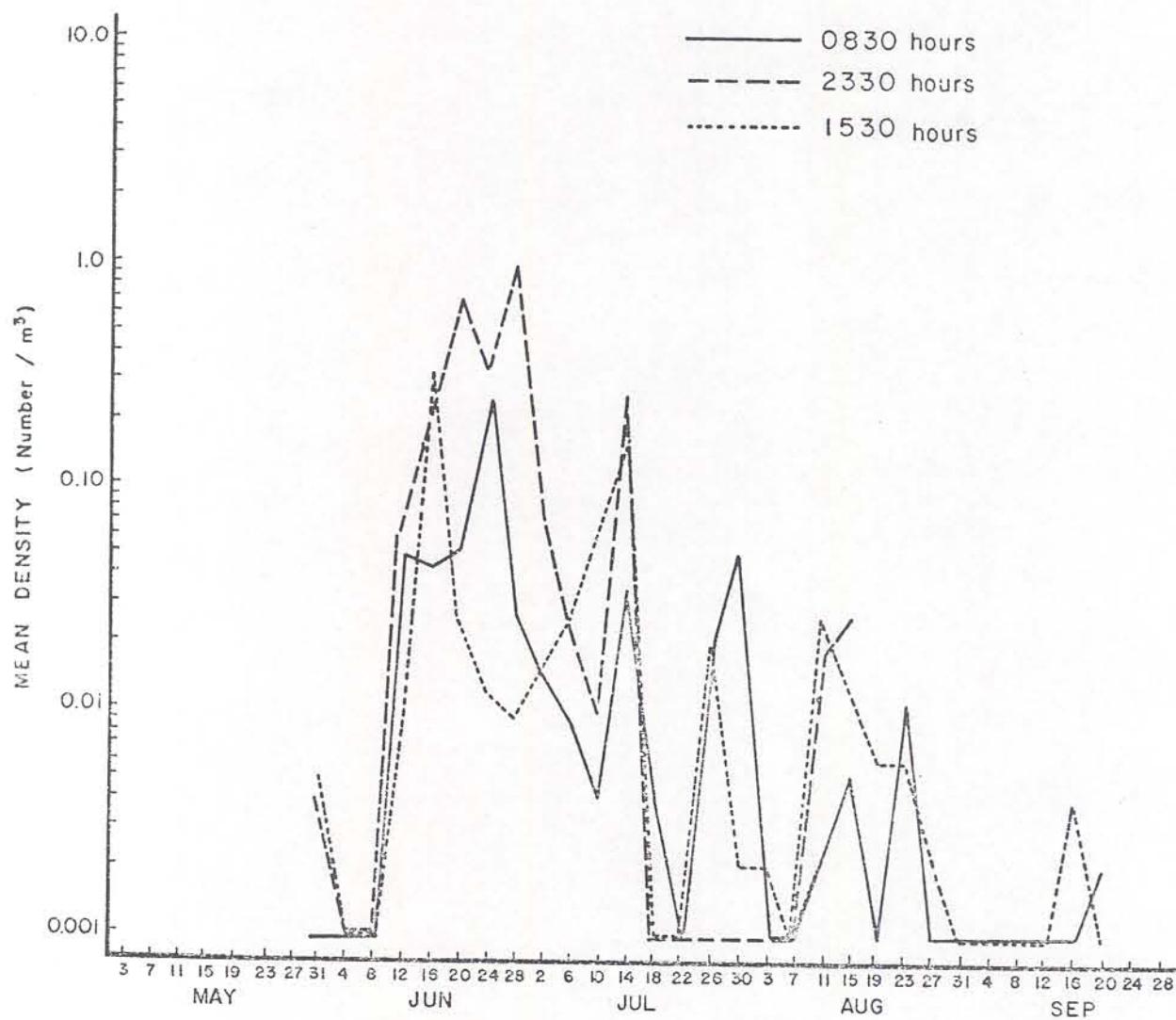


Figure 25. Mean density (number/ m^3) of alewife larvae collected by plankton net at various times of day at Dean H. Mitchell Station, May through December 1975.

NALCO ENVIRONMENTAL SCIENCES

449×10^6 , 3.7×10^6 , 1.6×10^6 and 33000 in May, June, July and August respectively, at average flow, totalling about 454×10^6 for the entire year (Table 12). At capacity flow, estimates were proportionately higher with a total entrainment loss of 815×10^6 carp eggs estimated for the year (Table 12). Swee and McCrimmon (p. 160, 1966) reported the average fecundity of female carp to be 0.645×10^6 eggs, depending on size. Based on this estimate, total number of carp eggs entrained annually at Dean H. Mitchell Station represent the lost egg production of 704 to 1263 female carp annually.

There were no apparent differences in carp egg densities at various times of day (Figure 26).

Carp were frequently seen in the discharge canal displaying spawning behavior (schooling, breaking surface, etc.). They were rarely seen in the intake canal and no carp were collected from lake gill net locations (p. 220 in NALCO ES, 1976). It was this occurrence of carp in the discharge canal which prompted the investigators to question whether the carp eggs were in fact entrained from points before the intake structure or were released by individuals spawning in the discharge canal. On several occasions, adult spawning pairs were seen to closely approach the plankton nets and eggs may have been released directly into the net (0730 hrs on 15-16 May 1975) (Table C-81, Appendix C). Intake and discharge sample data were inadequate to make comparisons. Only one sample (0715 hours on 24 May) showed substantial differences in density with discharge canal carp egg densities exceeding those

NALCO ENVIRONMENTAL SCIENCES

Table 12. Estimated monthly total numbers^a of carp (*Cyprinus carpio*) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975.

Month	Average Observed Flow		Maximum Flow	
	Eggs	Larvae	Eggs	Larvae
May	448,951,000	6,582,000	807,422,000	11,838,000
June	3,732,000	437,000	5,319,000	622,000
July	1,574,000	161,000	1,962,000	201,000
August	33,000	0	39,000	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
Total	454,290,000	7,180,000	814,742,000	12,661,000

^a Based on discharge samples only.

NALCO ENVIRONMENTAL SCIENCES

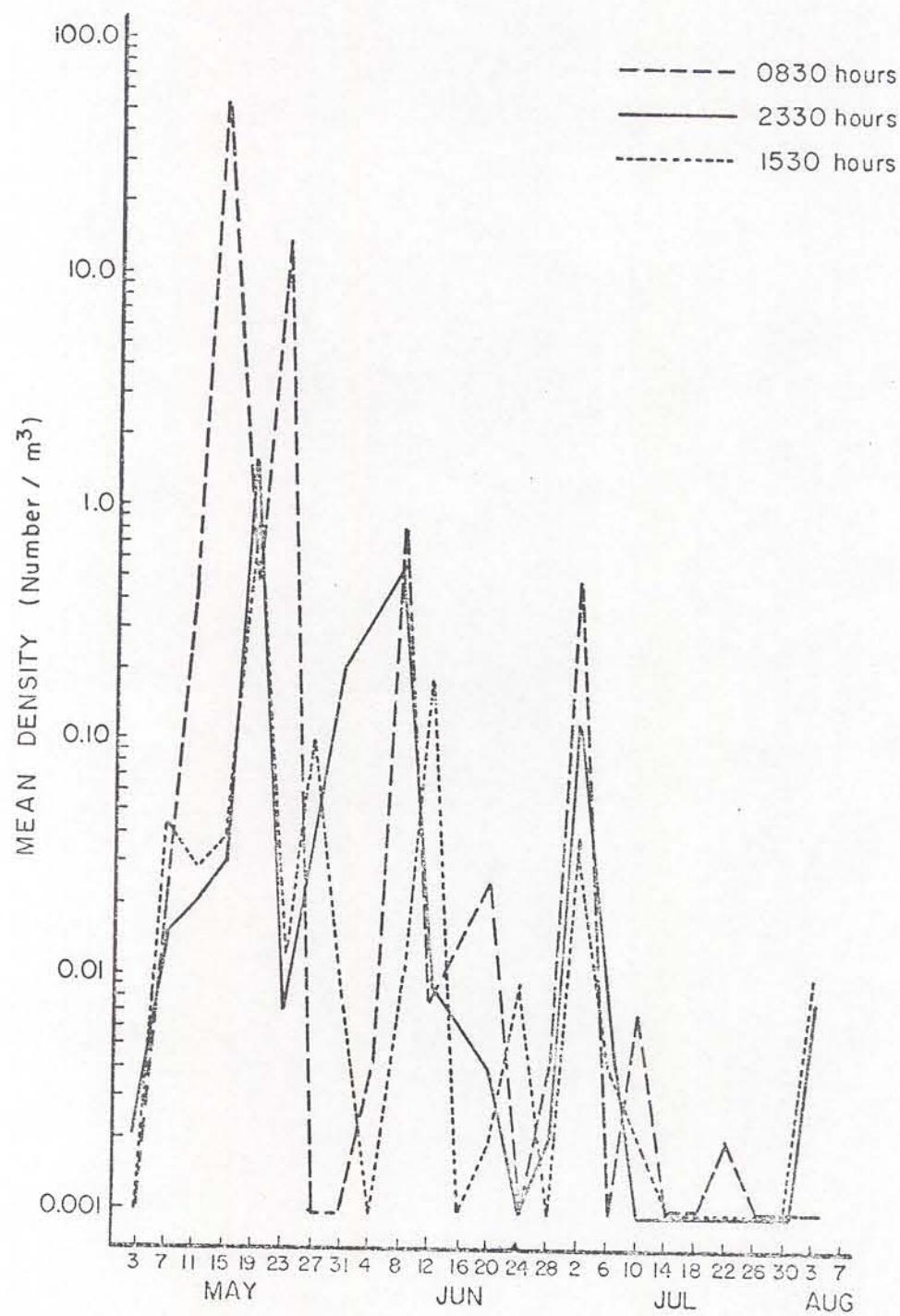


Figure 26. Mean density (number/m³) of carp eggs collected by plankton net at various times of day from discharge canal at Dean H. Mitchell Station, May through August 1975.

NALCO ENVIRONMENTAL SCIENCES

of the intake canal (Table C-83, Appendix C). Only one carp was removed from the screens (19 May, Table B-1, Appendix B) during the month. This fish was too badly decomposed to determine if eggs had been released. It is possible that some of the carp eggs taken on 15-16 May and 19-20 May might have originated with that fish. An impinged carp taken on 2-3 July was immature and not in a spawning condition. Consequently this carp was not the source of entrained carp eggs on that date.

b. Larvae

Carp larvae first occurred in entrainment samples on 11-12 May and reached maximum occurrence in late May. Carp larvae were infrequently present from June to mid-July (Table C-78 through C-96, Appendix C). The last carp larva was taken on 30 July (Table C-101, Appendix C).

Highest sample density of carp larvae was 0.212 m^{-3} with highest daily density (0.121 m^{-3}) occurring on 19-20 May (Table C-82, Appendix C). Monthly average densities were 0.044 m^{-3} , 0.009 m^{-3} and 0.003 m^{-3} for May, June and July, respectively.

Based on mean 8-hour sample densities, it was estimated that totals of 7×10^6 to 13×10^6 carp larvae would be entrained annually, depending on flow, with 92% of these entrained in May (table 12).

Carp larvae did not appear to be more active at any one particular time of day although fewer were taken in morning (0730 hrs) samples (Figure 27). No growth pattern was readily

NALCO ENVIRONMENTAL SCIENCES

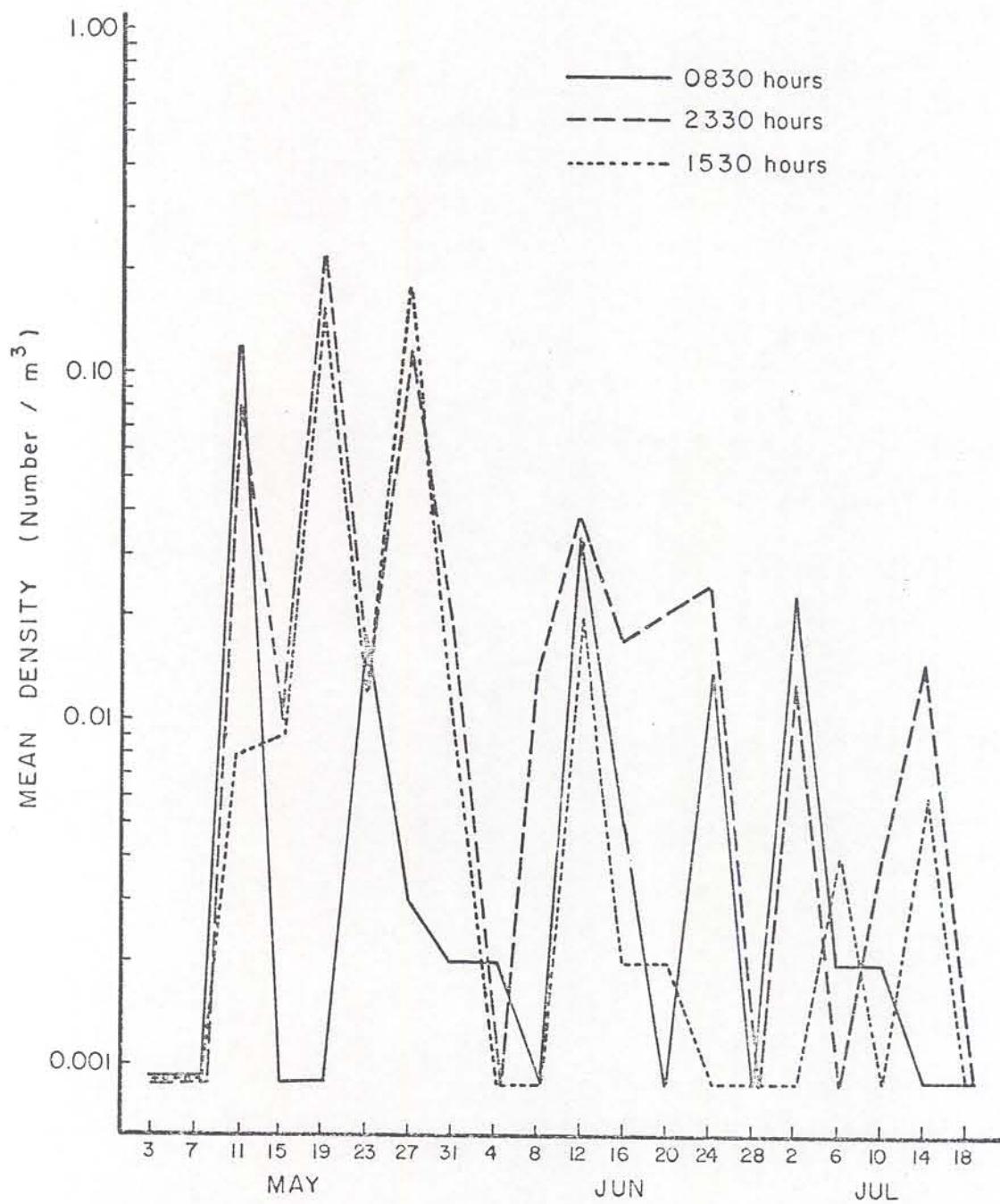


Figure 27. Mean density (number/m³) of carp larvae collected by plankton net at various times of day at Dean H. Mitchell Station, May through December 1975.

NALCO ENVIRONMENTAL SCIENCES

discernible from month to month. Total length of all 422 carp larvae captured from May through July ranged from 4.0 mm to 8.0 mm (Figure 28) with a mode length of 6.0-6.1 mm.

4. Troutperch

a. Eggs

A total of 13 eggs identified as troutperch was collected in entrainment samples from 31 August through 10 October 1975 (Tables C-103 through C-113, Appendix C). These collected eggs represented a combined average monthly density of 0.002 m^{-3} for September. Estimated totals entrained annually were 82000 to 105,000 depending on intake flow rate (Table 13). Fecundity estimates were not available for troutperch. Also, too few eggs were taken to make day/night or intake/discharge comparisons.

b. Larvae

The first troutperch larva was captured on 23 August, 8 days before the first eggs of that species were collected. A total of 14 troutperch larvae were collected between 23 August and 10 November 1975 with nine taken in September (Tables C-113 through C-115, Appendix C). Estimated totals of troutperch larvae lost through entrainment were 91000 and 129,000 annually, at average and capacity flow, respectively (Table 13).

The occurrence of troutperch larvae was too infrequent to support generalizations about activity or size distribution except to note that 12 of the 14 larvae were collected at 2330 hrs (Tables C-103 through C-115, Appendix C). Total lengths

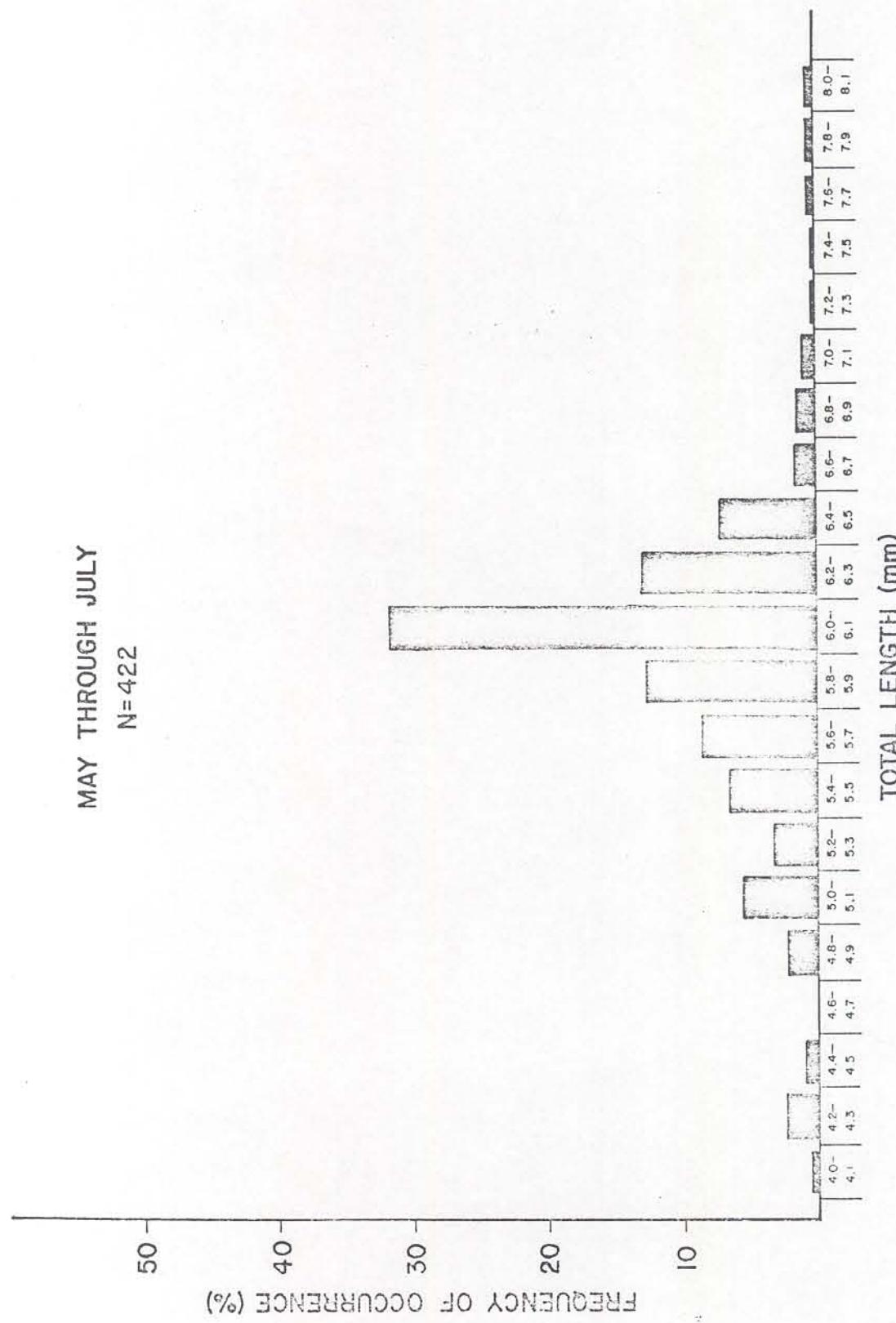


Figure 28. Length frequency distribution of larval carp collected by plankton net at Dean H. Mitchell Station, May through July 1975.

NALCO ENVIRONMENTAL SCIENCES

Table 13. Estimated monthly total numbers^a of troutperch (Percopsis omiscomaycush) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975.

Month	Average Observed Flow		Maximum Flow	
	Eggs	Larvae	Eggs	Larvae
May	0	0	0	0
June	0	0	0	0
July	23,000	0	29,000	0
August	36,000	5,000	44,000	7,000
September	15,000	63,000	19,000	81,000
October	8,000	5,000	13,000	9,000
November	0	18,000	0	32,000
December	0	0	0	0
Total	82,000	91,000	105,000	129,000

^a Based on discharge samples only.

NALCO ENVIRONMENTAL SCIENCES

ranged from 5.8 mm to 19.4 mm in August and September with 8 of 10 less than 10 mm in total length.

5. Slimy Sculpin

a. Eggs

Six eggs were collected in July which were subsequently identified as slimy sculpin (Tables C-116 through C-124, Appendix C). Based on 4 eggs taken in a midnight sample on 22-23 July, the mean monthly density of slimy sculpin eggs was 0.0004 m^{-3} (Table C-121, Appendix C). Estimated totals entrained for the month were 27000 and 39000 at average observed and full flow respectively (Table 14).

b. Larvae

Two slimy sculpin larvae were also collected, one at 1445 hrs on 10 July and one at 0730 hrs the following morning (Table C-118, Appendix C). The total lengths of these larvae were 11.9 mm and 11.2 mm respectively. These two larvae represented the total estimated monthly entrainment of between 9000 and 12000 slimy sculpin larvae, depending on flow (Table 14).

NALCO ENVIRONMENTAL SCIENCES

Table 14. Estimated monthly total numbers^a of slimy sculpin (Cottus cognatus) eggs and larvae entrained at Dean H. Mitchell Station, May through December 1975.

Month	Average Observed Flow		Maximum Flow	
	Eggs	Larvae	Eggs	Larvae
May	0	0	0	0
June	0	0	0	0
July	27,000	9,000	39,000	12,000
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
Total	27,000	9,000	39,000	12,000

^a Based on discharge samples only.

NALCO ENVIRONMENTAL SCIENCES

V. References Cited

- Cima, G., M. Cochran and M. Kitchel. 1976. Annual interpretive report on fish eggs and larvae in Lake Michigan near Zion and Waukegan Generating Stations, 1975. In: Compilation of reports relating to entrainment and impingement studies at Zion Generating Station, 1976, Vol. I, R. D. Arneson, Project Coordinator. Report to Commonwealth Edison Company, Chicago, Illinois by NALCO Environmental Sciences.
- Cochran, M. and M. Kitchel. 1976. Fish impingement at Zion Station, January through December 1975. In: Compilation of reports relating to entrainment and impingement studies at Zion Generating Station, 1976, Vol. I, R. D. Arneson, Project Coordinator. Report to Commonwealth Edison Company, Chicago, Illinois by NALCO Environmental Sciences.
- Koch, R.A. 1973. A creel census of the Indiana waters of Lake Michigan, 1970-1972. Div. of Fish and Wildlf., Indiana Dept. Natural Resources, Indianapolis, Indiana. 29 pp.
- Limnetics. 1976. Review of the literature on Lake Michigan fish. In press.
- NALCO Environmental Sciences. 1976. Dean H. Mitchell Station 316(a) Demonstration. Report to Northern Indiana Public Service Company, Hammond, Indiana.
- Otto, R. G. 1975. The effects of once-through cooling on fish eggs and larvae in southwestern Lake Michigan. In: Operational environmental monitoring in Lake Michigan near Zion Station, July 1974 through June 1975, Vol. IV. Annual report to Commonwealth Edison Company, Chicago, Illinois by NALCO Environmental Sciences.
- _____. 1976. Comments on power plant entrainment effects on fish eggs and larvae. In: Compilation of reports relating to entrainment and impingement studies at Zion Generating Station, 1976, Vol. II. Report to Commonwealth Edison Company, Chicago, Illinois by NALCO Environmental Sciences.
- _____, J. O. Rice and M. Kitchel. 1975. Temperature effects on fish. In: Evaluation of thermal effects in southwestern Lake Michigan, Special Studies, 1972-1973 (R. G. Otto, Ed.). Report to Commonwealth Edison Company, Chicago, Illinois by Industrial BIO-TEST Laboratories, Inc.
- Rupp, R. S. 1965. Shore-spawning and survival of eggs of the American smelt. Trans. Amer. Fish. Soc. 94: 160-168.

NALCO ENVIRONMENTAL SCIENCES

APPENDIX A

NALCO ENVIRONMENTAL SCIENCES

Table A-1. Summary of operational monitoring data for Dean H. Mitchell Station, May 1975.

Date	Time	Temperatures (°F)			Screens	MW _e	Power Load m ³ /min	Circulator Flow % Capacity
		Intake	Discharge	ΔT				
5/3-4	0900	48	60	12	6	292	55	783.5
	1500	48	60	12	6	325	61	783.5
	2300	48	60	12	6	306	58	783.5
	0700	48	60	12	6	308	58	783.5
5/7-8	0900	52	64	12	6	322	61	783.5
	1600	55	68	13	6	323	61	783.5
	2400	53	66	13	6	310	59	984.1
	0800	53	66	13	6	304	57	984.1
5/11-12	1015	56	69	13	6	330	62	783.5
	1530	58	68	10	6	305	58	783.5
	2330	59	76	17	6	337	64	783.5
	0900	59	76	17	6	337	64	783.5
5/15-16	0900	56	68	12	7	413	78	984.1
	1500	59	75	16	7	425	80	984.1
	2400	58	73	15	7	415	78	984.1
	0800	60	74	14	7	414	78	984.1
5/19-20	0815	56	68	12	7	443	84	984.1
	1530	57	76	19	7	391	74	984.1
	2330	55	70	15	7	333	63	1184.7
	0830	55	70	15	7	468	88	1184.7
5/23-24	0900	58	62	4	7	329	62	1184.7
	1500	57	75	18	7	391	74	783.5
	2400	56	75	19	7	333	63	783.5
	0800	58	73	15	7	376	71	783.5

NALCO ENVIRONMENTAL SCIENCES

Table A-1. (continued)

Date	Time	Temperatures (°F)			Screens	MWe	% Capacity	Power Load	m³/min	Circulator Flow	% Capacity
		Intake	Discharge	ΔT							
5/27-28	1000	62	74	12	Screens	MWe	% Capacity	Power Load	m³/min	Circulator Flow	% Capacity
	1500	62	79	17							
	2300	60	76	16							
	0700	60	75	15							
5/31-6/1	0830	60	74	14	Screens	MWe	% Capacity	Power Load	m³/min	Circulator Flow	% Capacity
	1500	60	76	16							
	2300	59	73	14							
	0800	59	72	13							
	Average:	56	70	14							

NALCO ENVIRONMENTAL SCIENCES

Table A-2 Summary of operational monitoring data for Dean H. Mitchell Station, June 1975.

Date	Time	Temperatures (°F)			Screens	Power Load		Circulator Flow	
		Intake	Discharge	ΔT		MWe	% Capacity	m³/min	% Capacity
6/4-5	0800	50	68	18	8	367	69	783.5	50
	1530	51	69	18	8	372	70	783.5	50
	2330	52	69	17	8	378	71	783.5	50
	0715	52	69	17	8	386	73	783.5	50
6/8-9	0830	63	80	17	8	242	46	783.5	50
	1430	63	80	17	8	427	81	783.5	50
	2300	61	83	22	8	397	75	783.5	50
	0800	60	81	21	8	452	85	783.5	50
6/12-13	0800	55	70	15	8	446	84	1165.8	74
	1500	54	70	16	8	479	90	1165.8	74
	2400	53	68	15	8	340	64	1165.8	74
	0800	53	67	14	8	435	82	1165.8	74
6/16-17	0900	54	70	16	8	459	87	965.2	62
	1600	52	72	20	8	485	92	965.2	62
	2430	53	67	14	8	380	72	965.2	62
	0830	53	71	18	8	461	87	965.2	62
6/20-21	0900	64	78	14	8	441	83	1567.0	100
	1500	64	78	14	8	466	88	1567.0	100
	2400	64	78	14	8	402	76	1567.0	100
	0830	64	76	12	8	445	84	1567.0	100
6/24-25	0830	59	70	11	8	485	92	1366.4	87
	1630	59	72	13	8	470	89	1366.4	87
	2430	64	78	14	8	454	86	1366.4	87
	0830	64	76	12	8	458	86	1366.4	87

NALCO ENVIRONMENTAL SCIENCES

Table A-2. (continued)

Date	Time	Intake	Discharge	ΔT	Screens	MWe	% Capacity	m ³ /min	% Capacity
6/28-29	0845	62	70	8	254	48	965.2	62	
	1600	68	80	12	8	345	65	965.2	62
24J5	68	80	12	8	362	68	1165.8	74	
0815	67	74	7	8	272	51	1165.8	74	
Average:	59	74	15	8	406	77	1099.6	70	

NALCO ENVIRONMENTAL SCIENCES

Table A-3. Summary of operational monitoring data for Dean H. Mitchell Station, July 1975.

Date	Time	Temperatures (°F)			Screens	Power Load		Circulator Flow	
		Intake	Discharge	Δ T		MWe	%Capacity	m ³ /min	%Capacity
7/2-3	0800	72	82	10	8	383	72	1366.4	87
	1500	74	84	10	8	464	88	1366.4	87
	2415	75	87	12	8	400	76	1366.4	87
	0830	72	82	10	8	423	80	1366.4	87
7/5-7	0930	71	84	13	8	388	73	1165.8	74
	1630	68	82	14	7	411	78	1165.8	74
	2430	72	81	9	7	259	49	783.5	50
	0830	74	86	12	7	394	74	1184.7	76
7/10-11	0800	75	85	10	8	394	74	1567.0	100
	1600	75	87	12	8	445	84	1567.0	100
	2300	76	82	6	8	340	64	1567.0	100
	0645	75	83	8	8	320	60	1567.0	100
7/14-15	0815	73	84	11	8	297	56	783.5	50
	1530	74	79	5	8	165	31	984.1	63
	2430	72	78	6	8	160	30	984.1	63
	0745	71	79	8	8	223	42	1184.7	76
7/18-19	0345	68	76	8	8	357	67	1567.0	100
	1645	64	76	12	8	422	80	1184.7	76
	0100	55	64	9	8	265	50	1184.7	76
	0900	48	58	10	8	271	51	1184.7	72
7/22-23	0800	66	68	3	8	337	64	1385.3	88
	1500	67	74	7	8	444	84	1385.3	88
	2445	62	72	10	8	185	35	1184.7	76
	0730	66	74	8	8	267	50	1184.7	76
7/26-27	0800	72	79	7	8	229	43	783.5	50
	1530	67	80	13	8	375	71	984.1	63
	2430	61	77	16	8	235	44	984.1	63
	0845	51	59	8	8	165	31	984.1	63
7/30-31	0800	66	74	8	8	439	83	1567.0	100
	1600	74	80	6	8	494	93	1567.0	100
	2400	73	81	8	8	431	81	1567.0	100
	0800	65	77	12	8	446	84	1567.0	100
Average:	69	78	9	8	338	64	1257.3	80	

NALCO ENVIRONMENTAL SCIENCES

Table A-4. Summary of operational monitoring data for Dean H. Mitchell Station, August 1975.

Date	Time	Temperatures (°F)			Screens	Power Load		Circulator Flow	
		Intake	Discharge	Δ T		mWe	% Capacity	m ³ /min	% Capacity
8/3-4	0815	71	79	8	242	46	1567.0	100	
	1330	73	86	13	6	448	85	1567.0	100
	2330	71	79	8	8	255	48	783.5	50
	0730	65	81	16	8	396	75	783.5	50
	-	-	-	-	-	-	-	-	-
8/7-8	0800	73	84	11	8	459	87	1567.0	100
	1630	73	82	9	8	344	65	1567.0	100
	2300	74	80	6	8	370	70	1567.0	100
	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
A-7	0800	69	79	10	8	431	81	1567.0	100
	1530	70	80	10	8	459	87	1567.0	100
	2330	71	82	11	8	352	67	1366.4	87
	0730	68	80	12	8	427	81	1366.4	87
	-	-	-	-	-	-	-	-	-
8/15-16	0800	73	83	10	8	451	85	1567.0	100
	1630	71	85	14	8	449	85	1366.4	87
	0100	67	78	11	8	336	64	1165.8	74
	0900	66	76	10	8	340	64	1165.8	74
	-	-	-	-	-	-	-	-	-
8/19-20	0800	70	82	12	8	454	86	1385.3	88
	1500	71	82	11	8	456	86	1385.3	88
	-	-	-	-	-	-	-	-	-
	0815	68	81	13	8	436	82	1385.3	88
	-	-	-	-	-	-	-	-	-
8/23-24	0830	70	82	12	8	435	82	1385.3	88
	1500	70	79	9	8	433	82	1385.3	88
	2300	67	77	10	8	444	84	1385.3	88
	0730	60	71	11	8	410	78	1385.3	88
	-	-	-	-	-	-	-	-	-

NALCO ENVIRONMENTAL SCIENCES

Table A-4. (continued)

Date	Time	Temperatures (°F)			Screens	mWe	% Capacity	Circulator Flow m ³ /min	% Capacity
		Intake	Discharge	Δ T					
8/27-28	0900	70	82	12	8	467	88	1385.3	88
	1415	69	84	15	8	491	93	1385.3	88
	2400	71	83	12	8	440	83	1385.3	88
	0830	66	77	11	8	447	84	1385.3	88
8/31-9/1	0815	66	74	8	8	218	41	783.5	50
	1430	66	74	8	8	211	40	783.5	50
	2330	68	78	10	8	241	46	783.5	50
	0830	68	76	8	8	232	44	783.5	50
	Average	69	80	11	8	386	73	1296.9	83

NALCO ENVIRONMENTAL SCIENCES

Table A-5. Summary of plant operational monitoring data at Dean H. Mitchell Station during September 1975.

Date	Time	Temperatures (°F)			Screens	mWe	% Capacity	Power Load m ³ /min	Circulator Flow % Capacity
		Intake	Discharge	ΔT					
9/4-5	0850	70	83	13	8	415	78	783.5	50
	1430	70	83	13	8	435	82	984.1	63
	2330	71	80	9	8	290	55	984.1	63
	0845	71	80	9	8	295	56	984.1	63
9/8-9 ^a	0900	68	80	12	7	412	78	1385.3	88
	1600	69	81	12	7	402	76	1385.3	88
	2400	69	81	12	7	399	75	1385.3	88
9/12	0900	66	79	13	8	425	80	1385.3	88
	1645	66	79	13	8	397	75	1385.3	88
	2300	66	79	13	8	423	80	1385.3	88
9/16	0900	66	79	13	8	422	80	1385.3	88
	1530	67	79	12	8	420	79	1385.3	88
	2330	66	78	12	8	315	60	1184.7	76
9/20	0900	65	77	12	8	410	77	1567.0	100
	1600	66	77	11	8	427	81	1567.0	100
	2400	66	76	10	8	395	75	1567.0	100
9/24	0830	68	85	17	8	443	84	984.1	63
	1530	67	83	16	8	419	79	984.1	63
	2330	63	80	17	8	447	84	984.1	63

NALCO ENVIRONMENTAL SCIENCES

Table A-5. (continued)

Date	Time	Temperatures (°F)			Screens	mWe	% Capacity	Power Load m ³ /min	Circulator Flow % Capacity
		Intake	Discharge	ΔT					
9/28	0800	61	72	11	8	333	63	984.1	63
	1630	63	73	10	8	300	57	1184.7	76
	2330	62	73	11	8	300	57	1184.7	76
Average	67	79	12			401	76	1227.7	78

a Only three operational observations made on and after 8 September 1975.

NALCO ENVIRONMENTAL SCIENCES

Table A-6. Summary of operational monitoring data for Dean H. Mitchell Station, October 1975.

Date	Time	Temperatures (°F)			Screens	MWe	Power Load % Capacity	m³/min	Circulator Flow % Capacity
		Intake	Discharge	ΔT					
10/2	0830	58	72	14	8	381	72	1184.7	76
	1530	62	74	12	8	380	72	1184.7	76
	2330	59	73	14	8	366	69	1184.7	76
10/6	0730	60	73	13	8	459	87	1385.3	88
	1530	60	73	13	8	486	92	1385.3	88
	2330	60	74	14	8	463	87	1184.7	76
10/10	0730	58	73	15	8	359	68	984.1	63
	1500	59	74	15	8	352	66	984.1	63
	2300	60	72	12	8	248	47	984.1	63
10/14	0800	60	73	13	8	420	79	1567.0	100
	1530	60	73	13	8	430	81	1385.3	88
	2330	61	74	13	8	413	78	1385.3	88
10/18	0830	59	72	13	8	284	54	783.5	50
	1500	58	73	15	8	336	63	783.5	50
	0030	62	75	13	8	334	63	783.5	50
10/22	0900	57	75	18	8	445	84	783.5	50
	1530	57	74	17	7	405	76	783.5	50
	0030	57	71	14	8	252	48	783.5	50
10/26	0730	57	74	17	8	309	58	802.4	51
	1445	57	76	19	8	315	60	802.4	51
	2300	57	75	18	8	330	62	802.4	51
10/30	0730	57	74	17	8	211	40	401.2	26
	1500	56	72	16	8	225	42	401.2	26
	2300	56	73	17	8	220	42	401.2	26
Average:		59	73	14	-	351	66	963.0	61

NALCO ENVIRONMENTAL SCIENCES

Table A-7. Summary of operational monitoring data for Dean H. Mitchell Station,
November 1975.

Date	Time	Temperatures (°F)	Intake	Discharge	ΔT	Screens	MWe	Power Load % Capacity	m³/min	Circulator Flow % Capacity
11/2	0900	54	70	16		6	225	42	601.8	38
	1530	56	71	15		6	265	50	601.8	38
	2330	54	72	18		5	265	50	601.8	38
11/6	0800	56	70	14		6	345	65	1003.0	64
	1500	56	70	14		6	364	69	1003.0	64
	2400	56	70	14		6	315	60	601.8	38
11/10	0730	52	65	13		6	339	64	1003.0	64
	1530	53	68	15		6	334	63	802.4	51
	2330	52	68	16		6	343	65	802.4	51
A-12	0745	50	63	13		6	331	63	1203.6	77
	1515	51	67	16		6	325	61	802.4	51
	2300	52	70	18		6	320	60	802.4	51
11/18	0730	48	64	16		5	340	64	1203.6	77
	1530	49	65	16		6	328	62	1203.6	77
	2330	49	65	16		6	337	64	1203.6	77
11/22	0730	48	59	11		6	221	42	601.8	38
	1530	49	62	13		6	218	41	601.8	38
	2330	48	59	11		6	215	41	802.4	51
11/26	1030	48	61	13		6	356	67	1003.0	64
	1530	48	60	12		6	339	64	1003.0	64
	2200	48	61	13		6	356	67	1003.0	64
11/30	0800	45	56	11		6	255	48	1003.0	64
	1600	45	57	12		6	329	62	1003.0	64
	2200	45	57	12		6	345	65	1003.0	64
Average:		50	65	15	-	309	58	894.3	57	

Table A-8.

Summary of plant operational monitoring data at Dean H. Mitchell Station
during December 1975.

NALCO ENVIRONMENTAL SCIENCES

Date	Time	Temperatures (F)			Screens	Power Load		Circulator Flow m ³ /min	% Capacity
		Intake	Discharge	ΔT		MWe	% Capacity		
12/4	0730	42	58	16	6	303	57	1184.7	76
	1530	43	54	11	6	331	63	1385.3	88
	2330	43	54	11	6	361	68	1385.3	88
12/8	0730	42	57	15	8	401	76	1385.3	88
	1430	42	56	14	8	414	78	1385.3	88
	2330	42	55	13	8	325	61	1385.3	88
12/12	0730	44	56	12	6	329	62	1203.6	77
	1530	44	56	12	6	355	67	1203.6	77
	0130	42	50	8	6	200	38	1184.7	76
12/16	0810	43	57	14	8	297	56	1165.8	74
	1600	43	57	14	8	299	56	1165.8	74
	2330	42	56	14	8	290	55	1165.8	74
12/20	0800	39	50	11	8	212	40	984.1	63
	1530	39	49	10	8	219	41	984.1	63
	2315	39	49	10	8	202	38	984.1	63
12/24	0830	38	50	12	8	318	60	1184.7	76
	1500	39	50	11	8	262	49	1184.7	76
	2230	38	44	6	8	265	50	1184.7	76
12/28	0815	36	49	13	8	348	66	1184.7	76
	1430	36	49	13	8	355	67	1184.7	76
	2300	39	48	9	8	344	65	1184.7	76
Average:	41	53	12			306	58	1202.9	77

NALCO ENVIRONMENTAL SCIENCES

Table A-9. Summary of plant operational monitoring data^a at Dean H. Mitchell Station during January 1976.

Date	Time	Temperatures (F)			ΔT	Screens	MWe % Capacity	Power Load	$\frac{\text{m}^3/\text{min}}{\text{Capacity}}$	Circulator Flow
		Intake	Discharge	8						
1/2	1000	38	53	15		386	73	1184.7		76
1/6	1045	33	50	17		392	74	984.1		63
1/10	0930	35	52	17		310	59	802.4		51
1/14	1130	34	51	17		435	82	984.1		63
1/18	1200	32	47	15		287	54	965.2		62
1/22	1115	33	49	16		374	71	1165.8		74
1/26	1145	33	49	16		303	57	764.6		49
1/30	1100	37	53	16		309	58	764.6		49
Average:		34	50	16		350	66	951.9		61

^a Only one reading taken per day starting 2 January 1976.

NALCO ENVIRONMENTAL SCIENCES

Table A-10 Summary of plant operational monitoring data at Dean H. Mitchell Station during February 1976.

Date	Time	Temperatures (°F)			Screens	MWe	% Capacity	Power Load m ³ /min	Circulator Flow % Capacity
		Intake	Discharge	ΔT					
2/3	1145	37	48	11	8	297	56	965.2	62
2/7	1130	39	53	14	8	310	59	764.6	49
2/11	1045	38	51	13	8	255	48	764.6	49
2/15	1230	43	54	11	8	307	58	1165.8	74
2/19	1100	43	55	12	8	277	52	965.2	62
2/23	1100	42	58	16	8	268	51	582.9	37
2/27	1130	44	65	21	8	346	65	582.9	37
Average:	41	55	55	14	-	294	56	827.3	53

NALCO ENVIRONMENTAL SCIENCES

Table A-11 Summary of plant operational monitoring data at Dean H. Mitchell Station during March 1976.

Date	Time	Temperatures (°F)	Discharge	ΔT	Screens	MWe	Power Load % Capacity	Circulator Flow m³/min % Capacity
3/2	1100	42	52	10	6	292	55	764.6 49
3/6	1200	41	50	9	6	123	23	382.3 24
3/10	1300	42	49	7	6	172	32	764.6 49
3/14	1115	42	53	11	4	206	39	382.3 24
3/18	1130	40	51	11	6	258	49	965.2 62
3/22	1130	42	54	12	6	303	57	965.2 62
3/26	1145	44	58	14	6	307	58	783.5 50
3/30	1100	46	59	13	6	309	58	783.5 50
	Average:			11	-	246	47	723.9 46

NALCO ENVIRONMENTAL SCIENCES

Table A-12. Summary of plant operational monitoring data at Dean H. Mitchell Station during April 1976.

Date	Time	Temperatures (°F)			Screens	MWe	Power Load % Capacity	Circulator Flow m³/min % Capacity
		Intake	Discharge	ΔT				
4/3	1015	44	60	16	6	282	53	582.9
4/7	1030	48	56	8	6	239	45	984.1
4/11	1100	48	60	12	6	182	34	582.9
4/15	1030	49	60	11	6	267	50	984.1
4/19	1030	51	60	9	8	233	44	1184.7
4/23	1145	50	60	10	6	254	48	1165.8
4/27	1030	51	68	17	8	323	61	965.2
	Average:		12	-		254	48	921.4
							59	59

NALCO ENVIRONMENTAL SCIENCES

APPENDIX B

NALCO ENVIRONMENTAL SCIENCES

Table B-1. Total number and weight (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during May 1975.

Species	Date						Total			
	5/3	5/7	5/11	5/15	5/19	5/23				
Alewife	Number Weight (kg)	1904 a 79.223	2403 a 102.377	1902 a 70.370	2291 a 86.585	1951 a 73.548	1601 a,b 64.192	982 a 36.547	638 a 24.130	13672 536.972
Rainbow smelt	Number Weight (kg)	0 0	0 0	0 0	1 0.035	1 0.005	3 0.110	1 0.020	0 0	0 0.170
Slimy sculpin	Number Weight (kg)	0 0	0 0	0 0	2 0.030	0 0	2 0.025	0 0	0 0	4 0.055
Spottail shiner	Number Weight (kg)	0 0	0 0	0 0	1 0.005	0 0	0 0	1 0.010	1 0.010	3 0.025
Troutperch	Number Weight (kg)	0 0	0 0	0 0	1 0.020	0 0	0 0	1 0.015	0 0	2 0.035
Ninespine stickleback	Number Weight (kg)	0 0	0 0	0 0	0 0	1 0.005	1 0.005	0 0	0 0	2 0.010
Coho salmon	Number Weight (kg)	0 0	0 0	0 0	0 0	1 0.305	0 0	0 0	0 0	1 0.305
Carp	Number Weight (kg)	0 0	0 0	0 0	0 -	1 c	0 0	0 0	0 0	1 -
Lake trout	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	1 0.285	0 0	0 0.285	

a Estimated by subsample.

b 24-hour estimate based on 16-hour sample collection.

c No weight, too badly decomposed.

13672

536.972

536.972

NALCO ENVIRONMENTAL SCIENCES

Table B-2. Total number and weight (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during June 1975.

Species	Date						Total		
	6/4	6/8	6/12	6/16	6/20	6/28			
Alewife	Number Weight (kg)	993 ^a 34.050	838 ^a 20.657	2912 ^a 62.652	1887 ^a 50.848	1281 ^a 39.952	1221 ^a 28.148	2199 ^a 64.468	11331 300.775
Rainbow smelt	Number Weight (kg)	0 0	0 0	1 0.010	3 0.095	1 0.005	5 0.055	2 0.010	12 0.175
Troutperch	Number Weight (kg)	0 0	1 0.015	0 0	1 0.030	1 0.015	1 0.025	2 0.025	6 0.110
Spottail shiner	Number Weight (kg)	0 0	0 0	0 0.020	2 0	0 0.005	1 0.005	1 0.010	4 0.035
Ninespine stickleback	Number Weight (kg)	0 0	0 0	0 0	0 0.010	2 0	0 0	1 0.005	3 0.015
Slimy sculpin	Number Weight (kg)	1 0.015	0 0	1 0.010	0 0	0 0.005	1 0.005	0 0	3 0.030
Yellow perch	Number Weight (kg)	0 0	0 0	0 0	1 0.090	0 0	1 0.055	0 0	2 0.145
Brown trout	Number Weight (kg)	0 0	1 0.280	0 0	0 0	0 0	0 0	0 0	1 0.280

^a Estimated by subsample.

11367
302

NALCO ENVIRONMENTAL SCIENCES

Table B-3. Total number and weight (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during July 1975.

Species	Date						Total			
	7/2	7/6	7/10	7/14	7/18	7/22	7/30			
Alewife	Number Weight (kg)	1017 ^a 26.332	531 ^{a,b} 14.982	337 ^a 8.399	87 1.905	90 1.985	106 2.545	90 2.050	87 2.435	2345 60.633
Yellow Perch	Number Weight (kg)	5 0.345	3 0.270	3 0.165	0 0	4 0.205	6 0.270	7 0.720	15 3.790	43 5.765
Rainbow Smelt	Number Weight (kg)	1 0.005	0 0	0 0	0 0	5 0.030	4 0.020	3 0.015	4 0.030	17 0.100
Slimy Sculpin	Number Weight (kg)	0 0	0 0	3 0.025	0 0	4 0.080	0 0	1 0.035	1 0.015	9 0.155
TROUTperch	Number Weight (kg)	3 0.040	0 0	0 0	0 0	0 0	3 0.045	0 0	0 0	6 0.085
Spottail Shiner	Number Weight (kg)	2 0.030	0 0	0 0	0 0	1 0.010	0 0	0 0	0 0	3 0.040
Ninepine Stickleback	Number Weight (kg)	0 0	0 0	2 0.010	0 0	0 0	0 0	0 0	0 0	2 0.010
Carp	Number Weight (kg)	1 0.375	0 0	0 0	0 0	0 0	0 0	0 0	0 0	1 0.375
Green Sunfish	Number Weight (kg)	0 0	0 0	0 0	0 0	1 0.005	0 0	0 0	0 0	1 0.005
Rainbow Trout	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	0 0	1 1.510	1 1.510	

^a Estimated by subsample.

^b 24-hour estimate based on 8-hour subsample only.

NALCO ENVIRONMENTAL SCIENCES

Table B-4. Total number and weight (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during August 1975.

Species	Date							Total
	8/3	8/7	8/11	8/15	8/19	8/23	8/27	
Alewife								
Number	23	3	56	8	50	48	30	1
Weight (kg)	0.645	0.065	1.665	0.275	1.590	1.425	0.910	0.025
Yellow perch								
Number	12	6	9	5	19	6	7	0
Weight (kg)	0.885	0.295	0.645	0.260	1.505	0.355	0.310	0
Rainbow smelt								
Number	4	1	2	1	0	2	0	0
Weight (kg)	0.020	0.005	0.010	0.020	0	0.010	0	0.067
Emerald shiner								
Number	0	0	6	0	2	2	0	0
Weight (kg)	0	0	0.030	0	0.010	0.010	0	0.050
Slimy sculpin								
Number	0	0	2	2	3	0	1	0
Weight (kg)	0	0	0.035	0.045	0.045	0	0.010	0
Common shiner								
Number	0	0	6	0	0	0	0	8
Weight (kg)	0	0	0.030	0	0	0	0	0.135
Spottail shiner								
Number	1	0	0	0	1	0	1	0
Weight (kg)	0.015	0	0	0	0.005	0	0.005	0
Troutperch								
Number	1	1	0	0	0	0	0	2
Weight (kg)	0.015	0.010	0	0	0	0	0	0.025
Common white sucker								
Number	0	0	0	0	0	1	0	1
Weight (kg)	0	0	0	0	0	1,200	0	1.200
Largemouth bass								
Number	0	0	1	0	0	0	0	1
Weight (kg)	0	0	0.015	0	0	0	0	0.015

NALCO ENVIRONMENTAL SCIENCES

Table B-5.Total numbers and weights of fish collected from the traveling screens at Dean H. Mitchell Station during September 1975.

Species	Total						Total
	9/4	9/8	9/12	9/16	9/20	9/24	
Alewife							
Number	3	2	0	0	5	1	3
Weight (Kg)	0.070	0.055	0	0	0.080	0.025	0.020
Rainbow smelt							
Number	0	0	0	5	0	4	0
Weight (Kg)	0	0	0	0.055	0	0.030	0
Yellow perch							
Number	0	1	0	1	0	2	0
Weight (Kg)	0	0.065	0	0.025	0	0.075	0
Spottail shiner							
Number	1	0	0	0	2	0	0
Weight (Kg)	0.005	0	0	0	0.010	0	0
Troutperch							
Number	1	0	0	0	0	0	0
Weight (Kg)	0.015	0	0	0	0	0	0
Gizzard shad							
Number	0	0	0	0	0	1	0
Weight (Kg)	0	0	0	0	0	0.010	0
Slimy sculpin							
Number	1	0	0	0	0	0	0
Weight (Kg)	0.005	0	0	0	0	0	0
Lake trout							
Number	0	0	0	0	1	0	1
Weight (Kg)	0	0	0	0.025	0	0	0.025

Table B-6. Total numbers and weights of fish collected from the traveling screens at Dean H. Mitchell Station during October 1975.

Species	Date						Total			
	10/2	10/6	10/10	10/14	10/18	10/22				
Alewife	Number Weight (kg)	1 0.005	1 0.005	0 0	8 0.130	1 0.010	1 0.035	47 0.235	10 0.050	69 0.470
Rainbow smelt	Number Weight (kg)	1 0.015	0 0	0 C	1 0.005	0 0	1 0.005	0 0	0 0	3 0.025
Troutperch	Number Weight (kg)	0 0	1 .015	0 0	0 0	0 0	0 0	0 0	0 0	0.015
Gizzard shad	Number Weight (kg)	0 0	0 0	0 0	1 0.015	0 0	0 0	0 0	0 0	1 0.015
Spottail shiner	Number Weight (kg)	0 0	C 0	0 0	0 0	0 0	0 0	0 0	0 0	1 0.015
Slimy sculpin	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	1 0.005	0 0	0 0	1 0.005
Chinook salmon	Number Weight (kg)	0 0	0 0	0 0	1 2.950	0 0	0 0	0 0	0 0	1 2.950

Table B-7. Total numbers and weights of fish collected from the traveling screens at Dean H. Mitchell Station during November 1975.

Species	Number	Weight (kg)	Date						Total
			11/7/2	11/7/6	11/7/10	11/7/14	11/7/18	11/7/22	
Alewife	4	52	112	1250 ^a	5000 ^a	980 ^a	375 ^a	965 ^a	8738
	0.020	0.170	0.345	5.000	2.045	5.675	1.342	4.313	18.910
Gizzard shad	0	0	0	0	0	0	2	0	18
	0	0	0	0	0	0	0.020	0	0.210
Rainbow smelt	0	1	0	0	0	0	0	0	20
	0.005	0	0	0	0	0	0	0	0.230
Troutperch	1	0	0	0	0	0	0	0	1
	0.030	0	0	0	0	0	0	0	0.005
Yellow perch	0	0	0	1	0	1	0	0	1
	0	0	0	0.030	0	0.080	0	0	0.030
Slimy sculpin	0	0	0	1	0	1	0	0	2
	0	0	0	0.015	0	0.005	0	0	0.110
Spottail shiner	0	0	1	0	0	0	0	0	2
	0	0	0.005	0	0	0	0	0	0.020
									1
								0	0.005

a Estimated by subsample.

NALCO ENVIRONMENTAL SCIENCES

Table B-8. Total numbers and weights (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during December 1975.

Species	Date						Total		
	12/4	12/8	12/12	12/16	12/20	12/24			
Alewife	Number Weight (kg)	703a 5.902	365a 1.816	47 0.240	56 0.365	20 0.140	15 0.295	1 0.010	1 8.768
Gizzard shad	Number Weight (kg)	13 0.325	25 0.500	9 0.160	124 1.602	139 2.724	100 2.167	28 0.105	438 7.583
Rainbow smelt	Number Weight (kg)	0 0	0 0.005	1 0.085	10 0.025	2 0.020	4 0	0 0	17 0.135
Yellow perch	Number Weight (kg)	1 0.060	1 0.045	0 0	4 0.655	0 0	4 0.310	0 0	10 1.070
Slimy sculpin	Number Weight (kg)	0 -	0 0	0 0	0 0.010	1 0	0 0	0 0	1 0.010
Spottail shiner	Number Weight (kg)	0 0	0 0	0 0.005	1 0.010	2 0.005	1 0	0 0	4 0.020
Common shiner	Number Weight (kg)	0 0	0 0	1 0.005	0 0	0 0.020	3 0	0 0	4 0.025
White sucker	Number Weight (kg)	0 0	0 0	0 0	0 0	1 0.015	0 0	0 0	1 0.015
Goldfish	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	0 0	0 0	1 0.300
Brown trout	Number Weight (kg)	0 0	1 0.105	0 0	0 0	0 0	0 0	0 0	1 0.105

NALCO ENVIRONMENTAL SCIENCES

Table B-9. Total numbers and weights (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during January 1976.

Species	Date						Total ^a
	1/2	1/6	1/10	1/14	1/18 ^a	1/22 ^a	
Alewife	Number Weight	5 (kg) 0.080	0 0	0 0	0 0	0 0	0 0.080
Gizzard shad	Number Weight	49 (kg) 1.165	50 1.165	93 1.495	41 0.445	5 -	10 -
Rainbow smelt	Number Weight	3 (kg) 0.045	0 0	0 0.035	0 0	0 0	0 0.080
Yellow perch	Number Weight	0 (kg)	0 0	1 0.005	0 0	1 -	0 0
Spottail shiner	Number Weight	0 (kg)	0 0	2 0.010	0 0	0 0	0 0.060
Slimy sculpin	Number Weight	2 (kg) 0.010	0 0	1 0.005	0 0	0 0	0 0.025
Troutperch	Number Weight	4 (kg) 0.020	0 0	1 0.005	0 0	0 0	0 0.055
Carp	Number Weight	1 (kg) 8.000	0 0	1 0	0 -	0 0	0 8.000
Ninespine stickleback	Number Weight	1 (kg) 0.005	0 0	2 0.010	0 0	0 0	0 0.015
Brown trout	Number Weight	0 (kg) 0.060	1 0	0 0	0 0	0 0	0 0.060
Rainbow trout	Number Weight	0 (kg)	0 0	1 0.775	0 C	0 0	0 0.775

a Estimated sample.

Table B-10. Total numbers and weights (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during February 1976.

Species	Date						Total
	2/3	2/7	2/11	2/15	2/19	2/27	
Alewife	Number Weight (kg)	2 0.045	2 0.045	0 0	0 0	0 0	0 0
Gizzard shad	Number Weight (kg)	1 0.020	1 0.100	0 0	0 0	0 0	0.090 0
Rainbow smelt	Number Weight (kg)	0 0	1 0.025	0 0	0 0	0 0	0.120 0
Spottail shiner	Number Weight (kg)	0 0	1 0.005	0 0	0 0	0 0	0.025 0
Goldfish	Number Weight (kg)	0 0	1 0.150	0 0	0 0	0 0	0.005 0
Rainbow trout	Number Weight (kg)	0 0	0 0.245	2 0	0 0	0 0	0.150 0
Brown trout	Number Weight (kg)	0 0	0 0.090	1 0	0 0	0 0	0.245 0.090

Table B-11. Total numbers and weights (kg) of fish collected from the traveling screens at Dean H. Mitchell Station during March 1976.

Species	Date						Total
	3/2	3/6	3/10	3/14	3/18	3/22	
Gizzard shad	Number	0	0	0	0	0	0
	Weight (kg)	0	0	0	0	0.110	0.130
Rainbow smelt	Number	0	0	0	0	0	0
	Weight (kg)	0	0	0	0	0.020	0.020
Yellow perch	Number	1	0	0	2	0	1
	Weight (kg)	0.200	0	0	0.030	0	0.025
Coho salmon	Number	0	1	0	0	0	1
	Weight (kg)	0	0.795	0	0	0	0.335
Lake trout	Number	0	0	0	1	0	1
	Weight (kg)	0	0	0	0.680	0	0.680

NALCO ENVIRONMENTAL SCIENCES

Table B-12. Total numbers and weights (kg) of fish collected from the travelling screens at Dean H. Mitchell Station during April 1976.

Species	Date						Total		
	4/7/3	4/7/7	4/7/11	4/7/15	4/7/19	4/7/23			
Alewife	Number Weight (kg)	0 0	9 0.045	0 0	51 1.530	241 ^a 9.700	186 ^a 5.630	216 ^a 3.900	703 20.805
Rainbow smelt	Number Weight (kg)	1 0.045	0 0	1 0.010	0 0	0 0	0 0	1 0.050	3 0.105
Gizzard shad	Number Weight (kg)	0 0	0 0	5 0.110	0 0	0 0	0 0	0 0	5 0.110
Slimy sculpin	Number Weight (kg)	0 0	0 0	0 0	0 0	1 0	1 0	1 0	1 0.005
Yellow perch	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	0 0	1 0.150	1 0.150
Ninespine stickleback	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	0 0	1 0.005	1 0.005
Bluntnose minnow	Number Weight (kg)	0 0	0 0	0 0	0 0	0 0	0 0	1 0.005	1 0.005

^a Estimated by subsample.

APPENDIX C

NALCO ENVIRONMENTAL SCIENCES

Table C-1. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 3 and 4 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae		
			No.	No. /m ³	No.	No. /m ³	
1545	A	783.5	0	0.000	0	0.000	
	B		0	0.000	0	0.000	
	C		0	0.000	0	0.000	
	D		2	0.020	0	0.000	
Total			2	0.020	0	0.000	
Mean			0.50	0.005	0	0.000	
2330	A	783.5	3	0.023	0	0.000	
	B		0	0.000	0	0.000	
	C		1	0.008	0	0.000	
	D		0	0.000	1	0.008	
Total			4	0.031	1	0.008	
Mean			1.00	0.008	0.25	0.002	
0830	A	783.5	0	0.000	0	0.000	
	B		2	0.014	0	0.000	
	C		2	0.020	0	0.000	
	D		1	0.009	0	0.000	
Total			5	0.043	0	0.000	
Mean			1.25	0.011	0	0.000	
Daily Total			11	0.094	1	0.008	
Daily Mean			0.92	0.008	0.08	0.0007	

NALCO ENVIRONMENTAL SCIENCES

Table C-2. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 7 and 8 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	783.5	1	0.010	0	0.000
	B		1	0.009	0	0.000
	C		1	0.009	0	0.000
	D		2	0.020	0	0.000
Total			5	0.048	0	0.000
Mean			1.25	0.012	0.00	0.000
2330	A	984.1	2	0.019	4	0.038
	B		0	0.000	8	0.067
	C		0	0.000	5	0.042
	D		1	0.008	2	0.016
Total			3	0.027	19	0.163
Mean			0.75	0.007	4.75	0.041
0715	A	984.1	0	0.000	0	0.000
	B		0	0.000	1	0.009
	C		1	0.008	0	0.000
	D		0	0.000	2	0.016
Total			1	0.008	3	0.025
Mean			0.25	0.002	0.75	0.006
Daily Total			9	0.083	22	0.188
Daily Mean			0.75	0.007	1.83	0.016

NALCO ENVIRONMENTAL SCIENCES

Table C-3. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 11 and 12 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1445	A	783.5	0	0.000	1	0.009
	B		1	0.008	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	3	0.024
	Total		1	0.008	4	0.033
	Mean		0.25	0.002	1.00	0.008
2330	A	783.5	0	0.000	32	0.294
	B		1	0.008	62	0.486
	C		1	0.008	54	0.437
	D		0	0.000	38	0.323
	Total		2	0.016	186	1.540
	Mean		0.50	0.004	46.50	0.385
0730	A	783.5	9	0.110	11	0.134
	B		14	0.147	15	0.158
	C		5	0.049	5	0.049
	D		4	0.040	5	0.050
	Total		32	0.346	36	0.391
	Mean		8.0	0.086	9.00	0.098
Daily Total			35	0.370	226	1.964
Daily Mean			3.75	0.031	18.83	0.164

NALCO ENVIRONMENTAL SCIENCES

Table C-4. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 15 and 16 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No. /m ³	No. /m ³
1500	A	984.1	1	0.007	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.007
Total			1	0.007	1	0.007
Mean			0.25	0.002	0.25	0.002
2400	A	984.1	0	0.000	3	0.022
	B		0	0.000	2	0.017
	C		0	0.000	3	0.020
	D		1	0.051	4	0.206
Total			1	0.051	12	0.265
Mean			0.25	0.013	3.00	0.066
0715	A	984.1	0	0.000	1	0.008
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.008
Mean			0.000	0.000	0.25	0.002
Daily Total			2	0.058	14	0.280
Daily Mean			0.50	0.005	1.17	0.023

NALCO ENVIRONMENTAL SCIENCES

Table C-5. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 19 and 20 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	984.1	0	0.000	0	0.000
	B		1	0.011	1	0.011
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			1	0.011	1	0.011
Mean			0.25	0.003	0.25	0.003
2300	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0800	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.001	0.00	0.000
Daily Total			1	0.011	1	0.011
Daily Mean			0.08	0.001	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-6. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 23 and 24 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	1	0.011
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.011
Mean			0.00	0.000	0.25	0.003
2345	A ^a	783.5	0	0.000	2	0.019
	B ^a		0	0.000	4	0.031
	C		0	0.000	1	0.010
	D		0	0.000	3	0.028
Total			0	0.000	10	0.088
Mean			0.00	0.000	2.50	0.022
0715	A ^a	783.5	0	0.000	1	0.008
	B		0	0.000	1	0.008
	C		0	0.000	1	0.008
	D		0	0.000	2	0.015
Total			0	0.000	5	0.039
Mean			0.00	0.000	1.25	0.010
Daily Total			0	0.000	16	0.138
Daily Mean			0.00	0.000	1.33	0.012

^a These replicates taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-7. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 27 and 28 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2300	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0700	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.00
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

^a These replicates taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-8. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 31 May and 1 June 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
	Mean		0.00	0.000	0.00	0.000
2330	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
	Mean		0.00	0.000	0.00	0.000
0800	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
	Mean		0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

^a These replicates collected from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-9 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 4 and 5 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.0	0.000	0.0	0.000
2330	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.0	0.000	0.0	0.000
0715	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.0	0.000	0.0	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.0	0.000	0.0	0.000

^a These replicates collected from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-10 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 8 and 9 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0715	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-11 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 12 and 13 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	1165.8	0	0.000	0.	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0700	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-12 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 16 and 17 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	965.2	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	965.2	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0830	A	965.2	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.013
Total			0	0.000	1	0.013
Mean			0.00	0.000	0.25	0.003
Daily Total			0	0.000	1	0.013
Daily Mean			0.00	0.000	0.008	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-13 Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 20 and 21 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-14. Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 24 and 25 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-15. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 28 and 29 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0700	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-16. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 2 and 3 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0700	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-17. Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 6 and 7 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1445	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0	0.000
0715	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-18. Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 10 and 11 July 1975.

Time	Replicate	Intake Flow m ³ /min	<u>Eggs</u>		<u>Larvae</u>	
			No.	No./m ³	No.	No./m ³
1445	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1567.0	0	0.000	0	0.000
	B		0	0.000	2	0.015
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	2	0.015
Mean			0.00	0.000	0.50	0.004
0730	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	2	0.015
Daily Mean			0.00	0.000	0.17	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-19. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 14 and 15 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	984.1	0	0.000	0	0.000
	B		0	0.000	1	0.008
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.008
Mean			0.00	0.000	0.25	0.002
2330	A	984.1	0	0.000	3	0.029
	B		0	0.000	1	0.010
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	4	0.039
Mean			0.00	0.000	1.00	0.008
0700	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0	0.000
Daily Total			0	0.000	5	0.047
Daily Mean			0.00	0.000	0.417	0.004

NALCO ENVIRONMENTAL SCIENCES

Table C-20. Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 18 and 19 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-21. Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 22 and 23 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0	0.000
0630	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-22. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 26 and 27 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.010
Total			0	0.000	1	0.010
Mean			0.00	0.000	0.25	0.002
0745	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.010
Daily Mean			0.00	0.000	0.08	0.0008

NALCO ENVIRONMENTAL SCIENCES

Table C-23. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0745	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-24. Number and number/m³ of rainbow smelt (*Osmerus mordax*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975, intake only.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	1	0.010
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	1	0.010
Total			0	0.000	2	0.020
Mean			0.00	0.000	0.50	0.005
0745	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	2	0.020
Daily Mean			0.00	0.000	0.17	0.002

^a These samples taken from intake control.

NALCO ENVIRONMENTAL SCIENCES

Table C-25 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 3 and 4 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-26. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 7 and 8 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1567.0	0	0.000	0	0.000
	B		0	0.000	1	0.009
	C		0	0.000	2	0.020
	D		0	0.000	1	0.012
Total			0	0.000	4	0.041
Mean			0.000	0.000	1.00	0.010
2330	A	1567.0	0	0.000	1	0.008
	B		0	0.000	2	0.015
	C		0	0.000	3	0.032
	D		0	0.000	0	0.000
Total			0	0.000	6	0.055
Mean			0.00	0.000	1.50	0.014
0730	A	1567.0	0	0.000	0	0.000
	B		0	0.000	1	0.009
	C		0	0.000	2	0.023
	D		0	0.000	2	0.021
Total			0	0.000	5	0.053
Mean			0.00	0.000	1.25	0.013
Daily Total			0	0.000	15	0.159
Daily Mean			0.00	0.000	1.25	0.013

NALCO ENVIRONMENTAL SCIENCES

Table C-27 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 7 and 8 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	0	0.000	2	0.022
	B		0	0.000	1	0.009
	C		0	0.000	4	0.039
	D		0	0.000	0	0.000
Total			0	0.000	7	0.070
Mean			0.00	0.000	1.75	0.018
2400	A	1567.0	0	0.000	1	0.010
	B		0	0.000	11	0.098
	C		0	0.000	11	0.078
	D		0	0.000	4	0.026
Total			0	0.000	27	0.212
Mean			0.00	0.000	6.75	0.053
0800	A	1567.0	0	0.000	0	0.000
	B		0	0.000	4	0.034
	C		0	0.000	2	0.017
	D		0	0.000	2	0.013
Total			0	0.000	8	0.064
Mean			0.00	0.000	2.00	0.016
Daily Total			0	0.000	42	0.346
Daily Mean			0.00	0.000	3.50	0.029

NALCO ENVIRONMENTAL SCIENCES

Table C-28 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 11 and 12 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1366.4	0	0.000	0	0.000
	B		0	0.000	1	0.004
	C		0	0.000	0	0.001
	D		0	0.000	0	0.000
Total			0	0.000	1	0.004
Mean			0.00	0.000	0.25	0.001
0730	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.004
Daily Mean			0.00	0.000	0.08	0.0003

NALCO ENVIRONMENTAL SCIENCES

Table C-29 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 15 and 16 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.010
Total			0	0.000	1	0.010
Mean			0.00	0.000	0.25	0.002
Daily Total			0	0.000	1	0.010
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-30. Number and number/m³ of rainbow smelt (*Csmerus mordax*) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 15 and 16 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.007
Total			0	0.000	1	0.007
Mean			0.00	0.000	0.25	0.002
0800	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.007
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-31. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 19 and 20 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
^a	A		-	-	-	-
	B		-	-	-	-
	C		-	-	-	-
	D		-	-	-	-
Total			-	-	-	-
Mean			-	-	-	-
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

^a No sample taken.

NALCO ENVIRONMENTAL SCIENCES

Table C-32. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 23 and 24 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1545	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1385.3	0	0.000	1	0.011
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.011
Mean			0.00	0.000	0.25	0.003
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.011
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-33. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 23 and 24 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0800	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-34. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 27 and 28 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.00	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	1385.3	0	0.000	0	0.000
	A		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-35. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 31 August and 1 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No/m ³	No.	No/m ³
1430	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-36. Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 31 August and 1 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0800	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-37 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 16 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0900	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	2	0.020
Total			0	0.000	2	0.020
Mean			0.00	0.000	0.50	0.005
1530	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	2	0.020
Daily Mean			0.00	0.000	0.17	0.002

NALCO ENVIRONMENTAL SCIENCES

Table C-38 Number and number/m³ of rainbow smelt (Osmerus mordax) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 16 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0900	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.012
Total			0	0.000	1	0.012
Mean			0.00	0.000	0.25	0.003
Daily Total			0	0.000	1	0.012
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-39. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 3 and 4 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No. /m ³	No. /m ³	No. /m ³	No. /m ³
1545	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0830	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-40. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 7 and 8 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A		0	0.000	0	0.000
	B	783.5	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A		0	0.000	0	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0715	A		0	0.000	0	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-41. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 11 and 12 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae
			No. /m ³	No. /m ³	No. /m ³
1445	A		0	0.000	0
	B	783.5	0	0.000	0
	C		0	0.000	0
	D		0	0.000	0
Total			0	0.000	0
Mean			0.00	0.000	0.00
2330	A		0	0.000	0
	B	783.5	0	0.000	0
	C		0	0.000	0
	D		0	0.000	0
Total			0	0.000	0
Mean			0.00	0.000	0.00
0730	A		0	0.000	0
	B	783.5	0	0.000	0
	C		0	0.000	0
	D		0	0.000	0
Total			0	0.000	0
Mean			0.00	0.000	0.00
Daily Total			0	0.000	0
Daily Mean			0.00	0.000	0.00

NALCO ENVIRONMENTAL SCIENCES

Table C-42. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 15 and 16 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No. /m ³	No. /m ³	No. /m ³	No. /m ³
1500	A		0	0.000	0	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A		0	0.000	0	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0715	A		0	0.000	0	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-43. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 19 and 20 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2300	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0800	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-44. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 23 and 24 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A ^a	783.5	1	0.010	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		1	0.009	0	0.000
Total			2	0.019	0	0.000
Mean			0.50	0.005	0.00	0.000
2345	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		7	0.073	0	0.000
	D		0	0.000	0	0.000
Total			7	0.073	0	0.000
Mean			1.75	0.018	0.00	0.000
0715	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		6	0.048	0	0.000
	D		0	0.000	0	0.000
Total			6	0.048	0	0.000
Mean			1.50	0.012	0.00	0.000
Daily Total			15	0.140	0	0.000
Daily Mean			1.25	0.012	0.00	0.000

^a These replicates collected from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-45. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 27 and 28 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A ^a	783.5	4	0.040	0	0.000
	B ^a		2	0.018	0	0.000
	C		3	0.027	0	0.000
	D		6	0.065	0	0.000
Total			15	0.150	0	0.000
Mean			3.75	0.038	0.00	0.000
2330	A ^a	783.5	11	0.080	0	0.000
	B ^a		65	0.503	0	0.000
	C		137	1.231	0	0.000
	D		111	1.101	0	0.000
Total			324	2.915	0	0.000
Mean			81.00	0.729	0.00	0.000
0700	A ^a	783.5	27	0.208	0	0.000
	B ^a		33	0.353	0	0.000
	C		71	0.538	0	0.000
	D		65	0.506	0	0.000
Total			196	1.605	0	0.000
Mean			49.00	0.401	0.00	0.000
Daily Total			535	4.670	0	0.000
Daily Mean			44.58	0.389	0.00	0.000

^a These replicates taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-46. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 31 May and 1 June 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A ^a	783.5	81	0.753	0	0.000
	B ^a		85	0.967	0	0.000
	C		147	1.521	2	0.021
	D		69	0.644	0	0.000
Total			382	3.885	2	0.021
Mean			95.50	0.971	0.50	0.005
2330	A ^a	783.5	3748	31.623	1	0.008
	B ^a		3134	25.014	0	0.000
	C		31584	228.936	1	0.007
	D		21408	164.994	0	0.000
Total			59874	450.567	2	0.015
Mean			14968.50	112.642	0.50	0.004
0800	A ^a	783.5	145	1.139	0	0.000
	B ^a		139	1.343	0	0.000
	C		297	2.826	0	0.000
	D		2280	19.228	0	0.000
Total			2861	24.536	0	0.000
Mean			715.25	6.134	0.00	0.000
Daily Total			63117	478.988	4	0.036
Daily Mean			5259.75	39.916	0.33	0.003

^a These replicates collected in the intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-47. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 4 and 5 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A ^a	783.5	538	6.556	0	0.000
	B ^a		523	6.779	0	0.000
	C		2568	48.081	0	0.000
	D		2316	98.974	0	0.000
Total			5945	160.390	0	0.000
Mean			1486.25	40.098	0.00	0.000
2330	A ^a	783.5	524	5.714	0	0.000
	B ^a		470	4.734	0	0.000
	C		265	3.023	0	0.000
	D		141	1.519	0	0.000
Total			1400	14.990	0	0.000
Mean			350.00	3.748	0.00	0.000
0715	A ^a	783.5	3968	36.155	0	0.000
	B ^a		2504	22.110	0	0.000
	C		1432	13.562	0	0.000
	D		4040	48.227	0	0.000
Total			11944	120.054	0	0.000
Mean			2986.00	30.014	0.00	0.000
Daily Total			19289	295.434	0.00	0.000
Daily Mean			1607.42	24.620	0.00	0.000

^a These samples taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-48. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 8 and 9 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	783.5	608	4.998	0	0.000
	B		487	4.269	0	0.000
	C		470	5.913	0	0.000
	D		198	2.027	0	0.000
Total Mean			1763	17.207	0	0.000
			440.75	4.302	0.00	0.000
2300	A	783.5	380	4.015	0	0.000
	B		320	3.720	0	0.000
	C		542	5.720	0	0.000
	D		208	3.978	0	0.000
Total Mean			1450	17.423	0	0.000
			362.5	4.358	0.00	0.000
0745	A	783.5	120	1.323	0	0.000
	B		50	0.625	0	0.000
	C		112	1.877	0	0.000
	D		20	0.283	0	0.000
Total Mean			302	4.108	0	0.000
			75.50	1.027	0.00	0.000
Daily Total			3515	38.748	0	0.000
Daily Mean			292.92	3.229	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-49. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 12 and 13 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1165.8	90	6.632	0	0.000
	B		168	4.716	1	0.028
	C		128	13.101	0	0.000
	D		126	0.802	2	0.013
Total			512	25.251	3	0.041
Mean			128.00	6.313	0.75	0.010
2315	A	1165.8	854	8.124	14	0.133
	B		1480	12.352	4	0.033
	C		1723	16.116	3	0.028
	D		1056	11.116	6	0.063
Total			5113	47.708	27	0.257
Mean			1278.25	11.927	6.75	0.064
0700	A	1165.8	421	4.071	8	0.077
	B		358	3.053	3	0.026
	C		439	3.478	3	0.024
	D		435	4.893	6	0.067
Total			1653	15.495	20	0.194
Mean			413.25	3.874	5.00	0.048
Daily Total			7278	88.454	50	0.492
Daily Mean			606.50	7.371	4.17	0.041

NALCO ENVIRONMENTAL SCIENCES

Table C-50. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 16 and 17 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	965.2	626	5.974	1	0.010
	B		554	5.207	14	0.132
	C		438	4.277	24	0.234
	D		499	5.566	77	0.859
Total			2117	21.024	116	1.235
Mean			529.25	5.256	29.00	0.309
2315	A	965.2	2196	30.190	0	0.014
	B		1554	18.707	1	0.012
	C		1308	22.552	5	0.086
	D		704	8.976	38	0.485
Total			5762	80.425	44	0.597
Mean			1440.50	20.106	11.00	0.149
0830	A	965.2	223	2.110	11	0.104
	B		195	1.872	2	0.019
	C		179	1.670	2	0.019
	D		232	2.473	3	0.032
Total			829	8.125	18	0.174
Mean			207.25	2.031	4.50	0.044
Daily Total			8708	109.574	178	2.006
Daily Mean			725.67	9.131	14.83	0.167

NALCO ENVIRONMENTAL SCIENCES

Table C-51. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 20 and 21 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	1567.0	6384	34.450	3	0.016
	B		1752	10.555	9	0.054
	C		1470	10.268	0	0.000
	D		957	9.331	5	0.035
Total			10563	64.604	17	0.105
Mean			2640.75	16.151	4.25	0.026
2330	A	1567.0	15936	109.173	59	0.404
	B		25056	185.986	49	0.364
	C		34784	278.807	109	0.874
	D		26368	247.100	69	0.647
Total			102144	821.066	286	2.289
Mean			25536.00	205.266	71.50	0.572
0730	A	1567.0	1808	19.987	1	0.011
	B		1942	22.474	7	0.081
	C		1362	16.555	2	0.024
	D		1442	14.397	9	0.090
Total			6554	73.413	19	0.206
Mean			1638.50	18.353	4.75	0.052
Daily Total			119261	959.083	322	2.600
Daily Mean			9938.42	79.924	26.83	0.217

NALCO ENVIRONMENTAL SCIENCES

Table C-52. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 24 and 25 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1366.4	427	2.872	2	0.013
	B		355	3.172	1	0.009
	C		451	4.140	2	0.018
	D		77	0.750	1	0.010
Total			1310	10.934	6	0.050
Mean			327.50	2.734	1.50	0.012
2330	A	1366.4	1004	14.353	5	0.071
	B		2244	20.510	80	0.731
	C		1028	9.737	6	0.057
	D		680	15.260	17	0.382
Total			4956	59.860	108	1.241
Mean			1239.00	14.965	27.00	0.310
0730	A	1366.4	420	6.351	9	0.136
	B		490	7.361	19	0.285
	C		472	8.273	9	0.158
	D		296	5.525	20	0.373
Total			1678	27.510	57	0.952
Mean			419.50	6.878	14.25	0.238
Daily Total			7944	98.304	171	2.243
Daily Mean			662.00	8.192	14.25	0.187

NALCO ENVIRONMENTAL SCIENCES

Table C-53. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 28 and 29 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1366.4	582	5.317	4	0.037
	B		782	8.489	0	0.000
	C		456	4.450	0	0.000
	D		552	4.856	0	0.000
Total			2372	23.112	4	0.037
Mean			593.00	5.778	1.00	0.009
2330	A	1366.4	6224	55.502	13	0.116
	B		9936	87.013	34	0.298
	C		7304	69.841	21	0.201
	D		11024	109.582	16	0.159
Total			34488	321.938	84	0.774
Mean			8622.00	80.484	21.00	0.194
0700	A	1366.4	1524	14.451	6	0.057
	B		479	3.989	2	0.017
	C		1312	10.491	1	0.008
	D		1872	17.365	3	0.028
Total			5187	46.296	12	0.110
Mean			1296.75	11.574	3.00	0.028
Daily Total			42047	391.346	100	0.921
Daily Mean			3503.92	32.612	8.33	0.077

NALCO ENVIRONMENTAL SCIENCES

Table C-54. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 2 and 3 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.,	No. /m ³
1515	A	1366.4	189	1.841	3	0.029
	B		51	0.489	0	0.000
	C		158	1.740	2	0.022
	D		256	2.046	2	0.016
Total			654	6.116	7	0.067
Mean			163.50	1.529	1.75	0.017
2315	A	1366.4	7616	56.637	6	0.045
	B		6256	57.807	6	0.055
	C		6272	54.554	12	0.104
	D		4320	41.716	7	0.068
Total			24464	210.714	31	0.272
Mean			6116.00	52.678	7.75	0.068
0700	A	1366.4	908	8.266	6	0.055
	B		441	4.140	0	0.000
	C		459	4.524	0	0.000
	D		890	8.109	0	0.000
Total			2698	25.039	6	0.055
Mean			674.50	6.260	1.50	0.014
Daily Total			27816	241.869	44	0.394
Daily Mean			2318.00	20.158	3.67	0.033

NALCO ENVIRONMENTAL SCIENCES

Table C-55. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 6 and 7 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1445	A	1165.8	185	1.656	12	0.107
	B		55	0.433	0	0.000
	C		106	0.759	0	0.000
	D		126	1.229	0	0.000
Total			472	4.077	12	0.107
Mean			118.00	1.019	3.00	0.027
2315	A	783.5	618	5.720	3	0.028
	B		888	6.846	3	0.023
	C		1296	11.113	2	0.017
	D		1736	25.693	2	0.030
Total			4538	49.372	10	0.098
Mean			1134.50	12.343	2.50	0.024
0715	A	1184.7	368	3.191	2	0.017
	B		298	2.592	1	0.009
	C		220	2.036	1	0.009
	D		589	5.240	0	0.000
Total			1475	13.059	4	0.035
Mean			368.75	3.265	1.00	0.009
Daily Total			6485	66.508	26	0.240
Daily Mean			540.42	5.542	2.17	0.020

NALCO ENVIRONMENTAL SCIENCES

Table C-56. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 10 and 11 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1445	A	1567.0	1768	14.538	18	0.148
	B		3664	26.294	2	0.014
	C		3008	22.151	6	0.044
	D		2520	23.523	6	0.056
Total			10960	86.506	32	0.262
Mean			2740.00	21.626	8.00	0.066
2330	A	1567.0	1204	11.698	2	0.019
	B		2560	19.342	0	0.000
	C		2476	23.358	2	0.020
	D		3840	29.070	0	0.000
Total			10080	83.468	4	0.039
Mean			2520.00	20.867	1.00	0.010
0730	A	1567.0	1656	10.358	0	0.000
	B		990	5.838	0	0.000
	C		634	5.038	2	0.016
	D		612	5.143	0	0.000
Total			3892	26.377	2	0.016
Mean			973.0	6.594	0.50	0.004
Daily Total			24930	196.351	38	0.317
Daily Mean			2077.67	16.363	3.17	0.026

NALCO ENVIRONMENTAL SCIENCES

Table C-57. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 14 and 15 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	984.1	8	0.075	4	0.037
	B		153	1.214	0	0.000
	C		11	0.087	36	0.285
	D		5	0.104	15	0.313
Total			177	1.480	55	0.635
Mean			44.25	0.370	13.75	0.159
2330	A	984.1	24	0.229	21	0.201
	B		4	0.039	49	0.478
	C		33	0.353	31	0.332
	D		228	2.178	1	0.010
Total			289	2.799	102	1.021
Mean			72.25	0.700	25.50	0.255
0700	A	1184.7	96	1.056	2	0.022
	B		98	0.942	0	0.000
	C		125	1.183	8	0.076
	D		87	0.892	4	0.041
Total			406	4.093	14	0.139
Mean			101.5	0.339	3.50	0.035
Daily Total			872	8.352	171	1.795
Daily Mean			74.75	0.696	14.25	0.150

NALCO ENVIRONMENTAL SCIENCES

Table C-58. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 18 and 19 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1184.7	34	0.552	0	0.000
	B		59	0.783	0	0.000
	C		44	0.609	0	0.000
	D		45	0.666	0	0.000
Total Mean			182	2.610	0	0.000
			45.50	0.652	0.00	0.000
2330	A	1184.7	33	0.270	0	0.000
	B		38	0.260	0	0.000
	C		36	0.328	0	0.000
	D		37	0.330	0	0.000
Total Mean			144	1.188	0	0.000
			36.00	0.297	0.00	0.000
0730	A	1184.7	24	0.217	1	0.009
	B		13	0.110	1	0.008
	C		17	0.137	0	0.000
	D		20	0.199	0	0.000
Total Mean			74	0.663	2	0.017
			18.50	0.166	0.50	0.004
Daily Total		400	4.461	2	0.017	
Daily Mean		33.33	0.372	0.17	0.0015	

NALCO ENVIRONMENTAL SCIENCES

Table C-59. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 22 and 23 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	109	0.908	0	0.000
	B		140	1.507	0	0.000
	C		102	1.070	0	0.000
	D		113	1.768	0	0.000
Total			464	5.253	0	0.000
Mean			116.00	1.313	0.00	0.000
2345	A	1184.7	165	0.907	0	0.000
	B		276	1.760	0	0.000
	C		179	1.214	0	0.000
	D		265	1.768	0	0.000
Total			885	5.649	0	0.000
Mean			221.25	1.412	0.00	0.000
0630	A	1184.7	244	2.235	0	0.000
	B		359	3.198	0	0.000
	C		307	3.306	0	0.000
	D		305	2.830	0	0.000
Total			1215	11.569	0	0.000
Mean			303.75	2.892	0.00	0.000
Daily Total			2564	22.471	0	0.000
Daily Mean			213.67	1.873	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-60. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 26 and 27 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	984.1	21	0.218	0	0.000
	B		11	0.129	4	0.047
	C		13	0.147	1	0.011
	D		13	0.153	3	0.035
	Total		58	0.647	8	0.093
2330	Mean		14.50	0.054	2.00	0.023
	A	984.1	34	0.351	0	0.000
	B		36	0.265	0	0.000
	C		53	0.427	0	0.000
	D		35	0.346	0	0.000
0745	Total		158	1.389	0	0.000
	Mean		39.50	0.347	0.00	0.000
	A	984.1	161	1.310	2	0.016
	B		145	1.224	0	0.000
	C		141	1.302	6	0.055
	D		115	1.153	1	0.010
	Total		562	4.989	9	0.081
	Mean		140.50	1.247	2.25	0.020
	Daily Total		778	7.025	17	0.174
	Daily Mean		64.83	0.585	1.42	0.014

NALCO ENVIRONMENTAL SCIENCES

Table C-61. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1567.0	57	0.453	0	0.000
	B		60	0.565	1	0.009
	C		76	0.672	0	0.000
	D		22	0.246	0	0.000
Total Mean			215	1.936	1	0.009
			53.75	0.484	0.25	0.002
2345	A	1567.0	71	0.671	0	0.000
	B		79	0.604	0	0.000
	C		87	0.690	0	0.000
	D		143	1.345	0	0.000
Total Mean			380	3.310	0	0.000
			95.00	0.828	0.00	0.000
0745	A	1567.0	46	0.617	0	0.000
	B		53	0.492	1	0.009
	C		30	0.304	3	0.030
	D		41	0.474	14	0.162
Total Mean			170	1.887	18	0.201
			42.50	0.472	4.50	0.050
Daily Total			765	7.133	19	0.210
Daily Mean			63.75	0.594	1.58	0.018

NALCO ENVIRONMENTAL SCIENCES

Table C-62. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975, intake only.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A ^a	1567.0	19	0.288	0	0.000
	B ^a		31	0.234	0	0.000
	C ^a		23	0.302	2	0.026
	D ^a		10	0.113	0	0.000
Total			83	0.937	2	0.026
Mean			20.75	0.234	0.50	0.006
2345	A ^a	1567.0	147	1.647	0	0.000
	B ^a		250	2.459	0	0.000
	C ^a		252	2.484	0	0.000
	D ^a		193	1.990	1	0.010
Total			842	8.580	1	0.010
Mean			210.50	2.145	0.25	0.002
0745	A ^a	1567.0	33	0.478	6	0.087
	B ^a		30	0.412	1	0.014
	C ^a		16	0.222	0	0.000
	D ^a		15	0.191	0	0.000
Total			94	1.303	7	0.101
Mean			23.50	0.326	1.75	0.025
Daily Total		1019	10.820	10	0.137	
Daily Mean		84.92	0.902	0.83	0.011	

^a These replicates taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-63. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 3 and 4 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	27	0.254	0	0.000
	B		20	0.167	1	0.008
	C		34	0.326	0	0.000
	D		11	0.113	0	0.000
Total			92	0.860	1	0.008
Mean			23.00	0.215	0.25	0.002
2330	A	783.5	45	0.275	0	0.000
	B		33	0.199	0	0.000
	C		35	0.426	0	0.000
	D		7	0.065	0	0.000
Total			120	0.965	0	0.000
Mean			30.00	0.241	0.00	0.000
0730	A	783.5	5	0.035	0	0.000
	B		24	0.158	0	0.000
	C		59	0.460	0	0.000
	D		12	0.142	0	0.000
Total			100	0.795	0	0.000
Mean			25.00	0.199	0.00	0.000
Daily Total			312	2.620	1	0.008
Daily Mean			26.00	0.218	0.08	0.0007

NALCO ENVIRONMENTAL SCIENCES

Table C-64. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 7 and 8 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1567.0	1	0.009	0	0.000
	B		0	0.000	0	0.000
	C		1	0.010	0	0.000
	D		2	0.023	0	0.000
Total			4	0.042	0	0.000
Mean			1.00	0.010	0.00	0.000
2330	A	1567.0	0	0.000	0	0.000
	B		1	0.008	0	0.000
	C		37	0.389	0	0.000
	D		0	0.000	0	0.000
Total			38	0.397	0	0.000
Mean			9.50	0.099	0.00	0.000
0730	A	1567.0	13	0.143	0	0.000
	B		5	0.044	0	0.000
	C		15	0.170	0	0.000
	D		5	0.053	0	0.000
Total			38	0.410	0	0.000
Mean			9.50	0.102	0.00	0.000
Daily Total			80	0.849	0	0.000
Daily Mean			6.67	0.071	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-65. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 7 and 8 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	1567.0	40	0.404	0	0.000
	B		0	0.000	0	0.000
	C		55	0.388	0	0.000
	D		0	0.000	0	0.000
Total			95	0.792	0	0.000
Mean			23.75	0.198	0.00	0.000
0800	A	1567.0	10	0.123	0	0.000
	B		4	0.034	0	0.000
	C		0	0.000	0	0.000
	D		2	0.013	0	0.000
Total			16	0.170	0	0.000
Mean			4.00	0.042	0.00	0.000
Daily Total			111	0.962	0	0.000
Daily Mean			9.25	0.080	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-66. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 11 and 12 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	4	0.042	1	0.011
	B		14	0.150	4	0.043
	C		8	0.084	3	0.031
	D		0	0.000	2	0.024
	Total		26	0.276	10	0.109
2330	Mean		6.50	0.069	2.50	0.027
	A	1366.4	200	0.879	1	0.004
	B		159	0.891	3	0.017
	C		199	1.274	6	0.038
	D		99	0.719	2	0.015
Total			657	3.763	12	0.074
	Mean		164.25	0.941	3.00	0.018
0730	A	1366.4	38	0.224	0	0.000
	B		25	0.227	1	0.009
	C		24	0.207	0	0.000
	D		13	0.129	0	0.000
	Total		100	0.787	1	0.009
Daily Total	Mean		25.00	0.197	0.25	0.002
	Daily Mean		783	4.826	23	0.192
			65.25	0.402	1.92	0.016

NALCO ENVIRONMENTAL SCIENCES

Table C-67. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 15 and 16 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	1366.4	3	0.027	0	0.000
	B		3	0.030	4	0.040
	C		1	0.010	0	0.000
	D		3	0.033	1	0.011
Total			10	0.100	5	0.051
Mean			2.50	0.025	1.25	0.013
2330	A	1165.8	5	0.047	2	0.019
	B		9	0.080	2	0.018
	C		2	0.020	5	0.049
	D		5	0.061	2	0.024
Total			21	0.208	11	0.110
Mean			5.25	0.052	2.75	0.028
0730	A	1165.8	2	0.019	0	0.000
	B		1	0.010	1	0.010
	C		1	0.010	0	0.010
	D		0	0.000	0	0.000
Total			4	0.039	1	0.020
Mean			1.00	0.010	0.25	0.005
Daily Total			35	0.347	17	0.181
Daily Mean			2.92	0.029	1.42	0.015

NALCO ENVIRONMENTAL SCIENCES

Table C-68. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 15 and 16 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.016	0	0.000
	D		1	0.015	0	0.000
Total			2	0.031	0	0.000
Mean			0.50	0.008	0.00	0.000
2400	A	1165.8	2	0.026	19	0.244
	B		1	0.011	29	0.319
	C		3	0.030	37	0.375
	D		7	0.052	15	0.112
Total			13	0.119	100	1.050
Mean			3.25	0.030	25.00	0.262
0800	A	1165.8	0	0.000	2	0.018
	B		0	0.000	1	0.009
	C		1	0.008	1	0.008
	D		1	0.007	3	0.027
Total			2	0.015	7	0.062
Mean			0.50	0.004	1.75	0.016
Daily Total			17	0.165	107	1.112
Daily Mean			1.42	0.014	8.92	0.093

NALCO ENVIRONMENTAL SCIENCES

Table C-69. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 19 and 20 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1385.3	0	0.000	0	0.000
	B		1	0.012	0	0.000
	C		0	0.000	1	0.011
	D		0	0.000	1	0.014
Total			1	0.012	2	0.025
Mean			0.25	0.003	0.50	0.006
a	A		-	-	-	-
	B		-	-	-	-
	C		-	-	-	-
	D		-	-	-	-
Total			-	-	-	-
Mean			-	-	-	-
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			1	0.012	2	0.025
Daily Mean			0.08	0.001	0.17	0.002

NALCO ENVIRONMENTAL SCIENCES

Table C-70. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 23 and 24 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1545	A	1385.3	0	0.000	0	0.000
	B		0	0.000	1	0.009
	C		0	0.000	0	0.000
	D		0	0.000	1	0.014
Total			0	0.000	2	0.023
Mean			0.00	0.000	0.50	0.006
2330	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.010
Total			0	0.000	1	0.010
Mean			0.00	0.000	0.25	0.002
0730	A	1385.3	1	0.009	0	0.000
	B		0	0.000	4	0.037
	C		0	0.000	0	0.000
	D		0	0.000	1	0.007
Total			1	0.009	5	0.044
Mean			0.25	0.002	1.25	0.011
Daily Total			1	0.009	8	0.077
Daily Mean			0.08	0.001	0.67	0.006

NALCO ENVIRONMENTAL SCIENCES

Table C-71. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 23 and 24 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	1	0.007
	D		0	0.000	0	0.000
Total			0	0.000	1	0.007
Mean			0.00	0.000	0.25	0.002
2400	A	1385.3	0	0.000	1	0.006
	B		0	0.000	3	0.021
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	4	0.027
Mean			0.00	0.000	1.00	0.007
0800	A	1385.3	0	0.000	0	0.000
	B		2	0.017	0	0.000
	C		0	0.000	0	0.000
	D		1	0.012	1	0.012
Total			3	0.029	1	0.012
Mean			0.75	0.007	0.25	0.003
Daily Total			3	0.029	6	0.046
Daily Mean			0.25	0.002	0.50	0.012

NALCO ENVIRONMENTAL SCIENCES

Table C-72. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 27 and 28 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	1385.3	0	0.000	0	0.000
	B		1	0.009	1	0.009
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			1	0.009	1	0.009
Mean			0.25	0.002	0.25	0.002
2315	A	1385.3	0	0.000	0	0.000
	B		1	0.008	1	0.008
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			1	0.008	1	0.008
Mean			0.25	0.002	0.25	0.002
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			2	0.017	2	0.017
Daily Mean			0.17	0.001	0.17	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-73. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 31 August and 1 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	783.5	1	0.022	0	0.000
	B		1	0.031	0	0.000
	C		0	0.000	0	0.000
	D		1	0.051	0	0.000
Total Mean			3	0.104	0	0.000
			0.75	0.026	0.00	0.000
2315	A	783.5	0	0.000	0	0.000
	B		1	0.014	0	0.000
	C		1	0.011	0	0.000
	D		0	0.000	0	0.000
Total Mean			2	0.025	0	0.000
			0.50	0.006	0.00	0.000
0730	A	783.5	2	0.034	0	0.000
	B		3	0.085	0	0.000
	C		2	0.040	0	0.000
	D		1	0.024	0	0.000
Total Mean			8	0.183	0	0.000
			2.00	0.046	0.00	0.000
Daily Total			13	0.312	0	0.000
Daily Mean			1.08	0.026	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-75. Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 31 August and 1 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		4	0.035	0	0.000
	D		0	0.000	0	0.000
Total			4	0.035	0	0.000
Mean			1.00	0.009	0.00	0.000
2400	A	783.5	0	0.000	0	0.000
	B		1	0.011	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			1	0.011	0	0.000
Mean			0.25	0.003	0.00	0.000
0800	A	783.5	0	0.000	0	0.000
	B		2	0.051	0	0.000
	C		2	0.040	0	0.000
	D		0	0.000	0	0.000
Total			4	0.091	0	0.000
Mean			1.00	0.023	0.00	0.000
Daily Total			9	0.137	0	0.000
Daily Mean			0.75	0.011	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-76 Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 16 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0900	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	1385.3	0	0.000	0	0.000
	B		0	0.000	1	0.015
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.015
Mean			0.00	0.000	0.25	0.004
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.015
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-77 Number and number/m³ of alewife (Alosa pseudoharengus) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 20 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0900	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.007
Total			0	0.000	1	0.007
Mean			0.00	0.000	0.25	0.002
1600	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.000
Daily Mean			0.00	0.000	0.08	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-78. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 3 and 4 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae		
			No.	No. /m ³	No.	No. /m ³	
1545	A	783.5	0	0.000	0	0.000	
	B		0	0.000	0	0.000	
	C		0	0.000	0	0.000	
	D		0	0.000	0	0.000	
Total			0	0.000	0	0.000	
Mean			0.00	0.000	0.00	0.000	
2330	A	783.5	0	0.000	0	0.000	
	B		1	0.007	0	0.000	
	C		0	0.000	0	0.000	
	D		0	0.000	0	0.000	
Total			1	0.007	0	0.000	
Mean			0.25	0.002	0.00	0.000	
0830	A	783.5	0	0.000	0	0.000	
	B		0	0.000	0	0.000	
	C		0	0.000	0	0.000	
	D		0	0.000	0	0.000	
Total			0	0.000	0	0.000	
Mean			0.00	0.000	0.00	0.000	
Daily Total			1	0.007	0	0.000	
Daily Mean			0.08	0.0006	0.00	0.000	

NALCO ENVIRONMENTAL SCIENCES

Table C-79. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 7 and 8 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	783.5	7	0.071	0	0.000
	B		2	0.019	0	0.000
	C		3	0.028	0	0.000
	D		6	0.059	0	0.000
Total		3.75	15	0.177	0	0.000
Mean			3.75	0.044	0.00	0.000
2330	A	984.1	3	0.028	0	0.000
	B		3	0.025	0	0.000
	C		1	0.008	0	0.000
	D		0	0.000	0	0.000
Total		1.75	7	0.061	0	0.000
Mean			1.75	0.015	0.00	0.000
0715	A	984.1	3	0.027	0	0.000
	B		3	0.026	0	0.000
	C		4	0.033	0	0.000
	D		3	0.024	0	0.000
Total		3.25	13	0.110	0	0.000
Mean			3.25	0.028	0.00	0.000
Daily Total		8.75	35	0.348	0	0.000
Daily Mean			8.75	0.029	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-80. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 11 and 12 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1445	A	783.5	2	0.018	2	0.018
	B		2	0.017	1	0.008
	C		3	0.023	0	0.000
	D		7	0.057	1	0.008
Total			14	0.115	4	0.034
Mean			3.50	0.029	1.00	0.008
2320	A	783.5	6	0.055	12	0.110
	B		2	0.016	10	0.078
	C		1	0.008	12	0.097
	D		0	0.000	5	0.043
Total			9	0.079	39	0.328
Mean			2.25	0.020	9.75	0.082
0720	A	783.5	32	0.390	8	0.097
	B		77	0.811	15	0.158
	C		44	0.430	12	0.117
	D		22	0.220	10	0.100
Total			175	1.851	45	0.472
Mean			43.75	0.463	11.25	0.118
Daily Total			198	2.045	88	0.834
Daily Mean			16.50	0.170	7.33	0.070

NALCO ENVIRONMENTAL SCIENCES

Table C-81. Number and number/m³ of carp (*Cyprinus carpio*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 15 and 16 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	984.1	3	0.021	0	0.000
	B		13	0.094	2	0.015
	C		3	0.022	2	0.015
	D		2	0.014	1	0.007
	Total		21	0.151	5	0.037
	Mean		4.25	0.038	1.25	0.009
2400	A	984.1	1	0.051	4	0.206
	B		5	0.037	7	0.051
	C		1	0.008	8	0.067
	D		3	0.020	11	0.074
	Total		10	0.116	30	0.398
	Mean		2.50	0.029	7.50	0.100
0715	A	984.1	8784	69.002	0	0.000
	B		5872	41.285	0	0.000
	C		5312	42.981	0	0.000
	D		7228	58.150	0	0.000
	Total		27196	211.418	0	0.000
	Mean		6799.00	52.854	0.00	0.000
Daily Total			27227	211.685	35	0.435
Daily Mean			2268.92	17.640	2.92	0.036

NALCO ENVIRONMENTAL SCIENCES

Table C-82. Number and number/m³ of carp (*Cyprinus carpio*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 19 and 20 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	984.1	165	1.734	25	0.263
	B		144	1.642	16	0.182
	C		0	0.000	3	0.026
	D		0	0.000	16	0.135
Total		77.25	309	3.376	85	0.606
Mean			77.25	0.844	21.25	0.152
2300	A	1184.7	13	0.093	50	0.356
	B		14	0.108	40	0.309
	C		762	5.725	16	0.120
	D		49	0.319	10	0.065
Total		209.5	838	6.245	116	0.850
Mean			209.5	1.561	29.00	0.212
0800	A	1184.7	48	0.370	0	0.000
	B		196	1.348	0	0.000
	C		15	0.090	0	0.000
	D		10	0.066	0	0.000
Total		67.25	269	1.874	0	0.000
Mean			67.25	0.468	0.00	0.000
Daily Total		1416	11.495	201	1.456	
Daily Mean		118.00	0.958	16.75	0.121	

Table C-83. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 23 and 24 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae		
			No.	No. /m ³	No.	No. /m ³	
1500	A ^a	783.5	1	0.010	0	0.000	
	B ^a		0	0.000	0	0.000	
	C		3	0.028	4	0.037	
	D		1	0.009	1	0.009	
Total			5	0.047	5	0.046	
Mean			1.25	0.012	1.25	0.012	
2345	A ^a	783.5	2	0.019	0	0.000	
	B ^a		0	0.000	0	0.000	
	C		1	0.010	4	0.042	
	D		0	0.000	1	0.009	
Total			3	0.029	5	0.051	
Mean			0.75	0.007	1.25	0.013	
0715	A ^a	783.5	50	0.423	0	0.000	
	B ^a		196	1.647	0	0.000	
	C		4720	37.778	4	0.032	
	D		2624	19.405	4	0.030	
Total			7590	59.253	8	0.062	
Mean			1897.50	14.813	2.00	0.016	
Daily Total			7598	59.329	18	0.159	
Daily Mean			633.17	4.944	4.50	0.013	

^a These replicates collected in intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-84. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 27 and 28 May 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A ^a	783.5	12	0.119	3	0.030
	B ^a		22	0.197	1	0.009
	C		1	0.009	31	0.280
	D		7	0.075	35	0.376
Total			42	0.400	70	0.695
Mean			10.50	0.100	17.5	0.174
2300	A ^a	783.5	5	0.036	13	0.094
	B ^a		2	0.015	9	0.070
	C		2	0.018	17	0.153
	D		3	0.030	16	0.159
Total			12	0.099	55	0.476
Mean			3.00	0.025	13.75	0.119
0700	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	1	0.011
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.011
Mean			0.00	0.000	0.25	0.003
Daily Total			54	0.499	126	1.182
Daily Mean			4.50	0.042	10.50	0.098

^a These replicates collected from intake canal.

Table C-85. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 31 May and 1 June 1975.

Time	Replicate	Intake Flow m ³ /min.	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A ^a	783.5	0	0.000	0	0,000
	B ^a		0	0.000	2	0.023
	C		2	0.021	2	0.021
	D		1	0.009	0	0.000
Total			3	0.030	4	0.044
Mean			0.75	0.008	1.00	0.011
2330	A ^a	783.5	48	0.405	1	0.008
	B ^a		38	0.303	3	0.024
	C		5	0.036	2	0.014
	D		10	0.077	4	0.031
Total			101	0.821	10	0.077
Mean			25.25	0.205	2.50	0.019
0800	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	1	0.010
	D		0	0.000	0	0.000
Total			0	0.000	1	0.010
Mean			0.00	0.000	0.25	0.002
Daily Total			104	0.851	15	0.131
Daily Mean			26.00	0.071	1.25	0.011

^a These replicates collected from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-86. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 4 and 5 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0	0.000
2330	A ^a	783.5	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0715	A ^a	783.5	1	0.009	0	0.000
	B ^a		0	0.000	0	0.000
	C		1	0.009	1	0.009
	D		0	0.000	0	0.000
Total			2	0.018	1	0.009
Mean			0.50	0.004	0.25	0.002
Daily Total			2	0.018	1	0.009
Daily Mean			0.17	0.0015	0.08	0.0008

^a These samples taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-87. Number and number/m³ of carp (*Cyprinus carpio*) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 8 and 9 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	783.5	2	0.016	0	0.000
	B		1	0.009	0	0.000
	C		1	0.013	0	0.000
	D		0	0.000	0	0.000
Total			3	0.038	0	0.000
Mean			0.75	0.010	0.00	0.000
2300	A	783.5	0	0.000	3	0.032
	B		0	0.000	1	0.012
	C		0	0.000	1	0.011
	D		119	2.276	0	0.000
Total			119	2.276	5	0.055
Mean			29.75	0.569	1.25	0.014
0745	A	783.5	80	0.882	0	0.000
	B		53	0.662	0	0.000
	C		105	1.760	0	0.000
	D		0	0.000	0	0.000
Total			238	3.304	0	0.000
Mean			59.50	0.826	0.00	0.000
Daily Total			360	5.618	5	0.055
Daily Mean			30.00	0.468	0.42	0.005

NALCO ENVIRONMENTAL SCIENCES

Table C-88. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 12 and 13 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1165.8	6	0.442	1	0.074
	B		1	0.028	0	0.000
	C		2	0.205	0	0.000
	D		5	0.032	1	0.006
Total			14	0.707	2	0.080
Mean			3.50	0.177	0.50	0.020
2315	A	1165.8	0	0.000	3	0.029
	B		3	0.025	3	0.025
	C		0	0.000	5	0.047
	D		1	0.011	5	0.053
Total			4	0.036	16	0.154
Mean			1.00	0.009	4.00	0.038
0700	A	1165.8	2	0.019	5	0.048
	B		0	0.000	0	0.000
	C		0	0.000	1	0.008
	D		1	0.011	7	0.079
Total			3	0.030	13	0.135
Mean			0.75	0.008	3.25	0.034
Daily Total			21	0.773	31	0.369
Daily Mean			1.75	0.064	2.58	0.031

NALCO ENVIRONMENTAL SCIENCES

Table C-89. Number and number/m³ of carp (*Cyprinus carpio*) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 16 and 17 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	965.2	0	0.000	1	0.010
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.010
Mean			0.00	0.000	0.25	0.002
2315	A	965.2	0	0.000	1	0.014
	B		0	0.000	0	0.000
	C		0	0.000	1	0.017
	D		0	0.000	3	0.038
Total			0	0.000	5	0.069
Mean			0.00	0.000	1.25	0.017
0830	A	965.2	0	0.000	1	0.009
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.011
Total			0	0.000	2	0.020
Mean			0.00	0.000	0.50	0.005
Daily Total			0	0.000	8	0.099
Daily Mean			0.00	0.000	0.67	0.008

NALCO ENVIRONMENTAL SCIENCES

Table C-90. Number and number/m³ of carp (*Cyprinus carpio*) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 20 and 21 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	1567.0	0	0.000	0	0.000
	B		1	0.006	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	1	0.010
Total			1	0.006	1	0.010
Mean			0.25	0.002	0.25	0.002
2330	A	1567.0	1	0.007	1	0.007
	B		1	0.007	2	0.014
	C		0	0.000	6	0.048
	D		0	0.000	1	0.009
Total			2	0.014	10	0.078
Mean			0.50	0.004	2.50	0.020
0730	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		2	0.024	0	0.000
	D		8	0.080	0	0.000
Total			10	0.104	0	0.000
Mean			2.50	0.026	0.00	0.000
Daily Total			13	0.046	11	0.088
Daily Mean			1.08	0.004	0.92	0.007

NALCO ENVIRONMENTAL SCIENCES

Table C-91. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 24 and 25 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	1366.4	2	0.018	0	0.000
	B		1	0.009	0	0.000
	C		1	0.009	0	0.000
	D		0	0.000	0	0.000
Total			4	0.036	0	0.000
Mean			1.00	0.009	0.00	0.000
2330	A	1366.4	0	0.000	0	0.000
	B		0	0.000	10	0.091
	C		0	0.000	1	0.009
	D		0	0.000	0	0.000
Total			0	0.000	11	0.100
Mean			0.00	0.000	3.75	0.025
0730	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	3	0.056
Total			0	0.000	3	0.056
Mean			0.00	0.000	0.75	0.014
Daily Total			4	0.036	14	0.156
Daily Mean			0.33	0.003	1.17	0.013

NALCO ENVIRONMENTAL SCIENCES

Table C-92. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net from the Dean H. Mitchell Station discharge canal, 28 and 29 June 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.010	0	0.000
	D		0	0.000	0	0.000
Total			1	0.010	0	0.000
Mean			0.25	0.002	0.00	0.000
0700	A	1366.4	0	0.000	0	0.000
	B		2	0.017	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			2	0.017	0	0.000
Mean			0.50	0.004	0.00	0.000
Daily Total			3	0.027	0	0.000
Daily Mean			0.25	0.002	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-93. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 2 and 3 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	1366.4	1	0.010	0	0.000
	B		1	0.010	0	0.000
	C		5	0.055	0	0.000
	D		10	0.080	0	0.000
Total			17	0.155	0	0.000
Mean			4.25	0.039	0.00	0.000
2315	A	1366.4	1	0.007	2	0.015
	B		14	0.129	0	0.000
	C		15	0.130	1	0.009
	D		21	0.203	3	0.029
Total			51	0.469	6	0.053
Mean			12.75	0.117	1.50	0.013
0700	A	1366.4	144	1.311	2	0.018
	B		38	0.357	1	0.009
	C		14	0.138	1	0.010
	D		19	0.173	6	0.055
Total			215	1.979	10	0.092
Mean			53.75	0.495	2.50	0.023
Daily Total			283	2.603	16	0.145
Daily Mean			23.58	0.217	1.33	0.012

NALCO ENVIRONMENTAL SCIENCES

Table C-94. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 6 and 7 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1445	A	1165.8	0	0.000	2	0.018
	B		1	0.008	0	0.000
	C		1	0.007	0	0.000
	D		2	0.020	0	0.000
Total			4	0.015	2	0.018
Mean			1.00	0.004	0.50	0.004
2315	A	783.5	3	0.028	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			3	0.028	0	0.000
Mean			0.75	0.007	0.00	0.000
0715	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	1	0.009
	D		0	0.000	0	0.000
Total			0	0.000	1	0.009
Mean			0.00	0.000	0.25	0.002
Daily Total			7	0.043	3	0.027
Daily Mean			0.58	0.004	0.25	0.002

NALCO ENVIRONMENTAL SCIENCES

Table C-95. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 10 and 11 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1445	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.007	0	0.000
	D		0	0.000	0	0.000
Total			1	0.007	0	0.000
Mean			0.25	0.002	0.00	0.000
2330	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	1	0.010
	D		0	0.000	1	0.008
Total			0	0.000	2	0.018
Mean			0.00	0.000	0.50	0.004
0730	A	1567.0	2	0.013	0	0.000
	B		0	0.000	0	0.000
	C		1	0.008	0	0.000
	D		1	0.008	1	0.008
Total			4	0.029	1	0.008
Mean			1.00	0.007	0.25	0.002
Daily Total			5	0.036	3	0.026
Daily Mean			0.42	0.003	0.25	0.002

NALCO ENVIRONMENTAL SCIENCES

Table C-96. Number and number/m³ of carp (*Cyprinus carpio*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 14 and 15 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A	984.1	0	0.000	1	0.009
	B		0	0.000	1	0.008
	C		0	0.000	1	0.008
	D		0	0.000	0	0.000
Total			0	0.000	3	0.025
Mean			0.00	0.000	0.75	0.006
2330	A	984.1	0	0.000	2	0.019
	B		0	0.000	0	0.000
	C		0	0.000	3	0.032
	D		0	0.000	1	0.010
Total			0	0.000	6	0.061
Mean			0.00	0.000	1.50	0.015
0700	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	9	0.086
Daily Mean			0.00	0.000	0.75	0.007

NALCO ENVIRONMENTAL SCIENCES

Table C-97. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 18 and 19 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-98. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 22 and 23 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.007	0	0.000
	D		0	0.000	0	0.000
Total			1	0.007	0	0.000
Mean			0.25	0.002	0.00	0.000
0630	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			1	0.007	0	0.000
Daily Mean			0.08	0.006	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-99. Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 26 and 27 July 1975.

Time	Replicate	Intake Flow m ³ /min	No. Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1530	A		0	0.000	0	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
	Total		0	0.000	0	0.000
	Mean		0	0.000	0	0.000
			0.00	0.000	0.00	0.000
2330	A		0	0.000	0.00	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
	Total		0	0.000	0	0.000
	Mean		0	0.000	0	0.000
			0.00	0.000	0.00	0.000
0745	A		0	0.000	0.00	0.000
	B	984.1	0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
	Total		0	0.000	0	0.000
	Mean		0	0.000	0	0.000
			0.00	0.000	0.00	0.000
	Daily Total				0.00	0.000
	Daily Mean		0.00	0.000	0.00	0.000
			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-100, Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0745	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-101 Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975, intake only.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	1	0.011
Total			0	0.000	1	0.011
Mean			0.00	0.000	0.25	0.003
2345	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0745	A ^a	1567.0	1	0.014	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			1	0.014	0	0.000
Mean			0.25	0.004	0.00	0.000
Daily Total			1	0.014	1	0.011
Daily Mean			0.08	0.001	0.08	0.001

^a These replicates taken from intake canal.

NALCO ENVIRONMENTAL SCIENCES

Table C-102 Number and number/m³ of carp (Cyprinus carpio) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 3 and 4 August 1975.

To	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1567.0	1	0.009	0	0.000
	B		1	0.008	0	0.000
	C		0	0.000	0	0.000
	D		2	0.021	0	0.000
Total			4	0.038	0	0.000
Mean			1.00	0.010	0.00	0.000
2330	A	783.5	2	0.012	0	0.000
	B		0	0.000	0	0.000
	C		1	0.012	0	0.000
	D		1	0.009	0	0.000
Total			4	0.033	0	0.000
Mean			1.00	0.008	0.00	0.000
0730	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			8	0.071	0	0.000
Daily Mean			0.67	0.006	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-1Q3. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 23 and 24 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1545	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	1	0.012
	D		0	0.000	0	0.000
Total			0	0.000	1	0.012
Mean			0.00	0.000	0.25	0.003
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	1	0.012
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-104. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 23 and 24 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0800	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-105. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 27 and 28 August 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1430	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-106. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 31 August and 1 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1430	A	783.5	1	0.022	0	0.000
	B		0	0.000	0	0.000
	C		2	0.060	0	0.000
	D		0	0.000	0	0.000
Total			3	0.082	0	0.000
Mean			0.75	0.020	0.00	0.000
2315	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			3	0.082	0	0.000
Daily Mean			0.25	0.007	0.00	0.000

Table C-107. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 31 August and 1 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2400	A	783.5	0	0.000	0	0.000
	B		2	0.019	0	0.000
	C		0	0.000	0	0.000
	D		3	0.026	0	0.000
Total			5	0.045	0	0.000
Mean			1.25	0.011	0.00	0.000
0800	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			5	0.045	0	0.000
Daily Mean			0.42	0.004	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-108 Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 12 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0900	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1645	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2300	A	1385.3	1	0.009	0	0.000
	B		1	0.009	0	0.000
	C		0	0.000	2	0.013
	D		0	0.000	1	0.009
Total			2	0.018	3	0.022
Mean			0.50	0.004	0.75	0.006
Daily Total			2	0.018	3	0.022
Daily Mean			0.17	0.002	0.25	0.002

NALCO ENVIRONMENTAL SCIENCES

Table C-109. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 16 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0900	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.007	0	0.000
	D		0	0.000	0	0.000
Total			1	0.007	0	0.000
Mean			0.25	0.002	0.00	0.000
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			1	0.007	0	0.000
Daily Mean			0.08	0.001	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-110 Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 24 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0830	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	984.1	0	0.000	0	0.000
	B		0	0.000	2	0.069
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	2	0.069
Mean			0.00	0.000	0.50	0.017
Daily Total			0	0.000	2	0.069
Daily Mean			0.00	0.000	0.17	0.006

NALCO ENVIRONMENTAL SCIENCES

Table C-III Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 24 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0830	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	984.1	0	0.000	1	0.047
	B		0	0.000	1	0.035
	C		0	0.000	0	0.000
	D		0	0.000	1	0.048
Total			0	0.000	3	0.130
Mean			0.00	0.000	0.75	0.032
Daily Total			0	0.000	3	0.130
Daily Mean			0.00	0.000	0.25	0.011

NALCO ENVIRONMENTAL SCIENCES

Table C-112. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 28 September 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
0800	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1630	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1184.7	0	0.000	1	0.008
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.008
Mean			0.00	0.000	0.25	0.002
Daily Total			0	0.000	1	0.008
Daily Mean			0.00	0.000	0.08	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-113. Number and number/m³ of troutperch (Percopsis Omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 10 October 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
0730	A	984	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	984	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	984	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.010	0	0.000
	D		1	0.013	0	0.000
Total			2	0.023	0	0.000
Mean			0.50	0.006	0.00	0.000
Daily Total			2	0.023	0	0.000
Daily Mean			0.17	0.002	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-114 Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the intake canal at Dean H. Mitchell Station, 10 October 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
0730	A	984	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
1530	A	984	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	984	0	0.000	1	0.007
	B		0	0.000	0	0.000
	C		0	0.000	1	0.009
	D		0	0.000	0	0.000
Total			0	0.000	2	0.016
Mean			0.00	0.000	0.50	0.004
Daily Total			0	0.000	2	0.016
Daily Mean			0.00	0.000	0.17	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-115. Number and number/m³ of troutperch (Percopsis omiscomaycush) eggs and larvae collected by plankton net from the discharge canal at Dean H. Mitchell Station, 14 November 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
0745	A	1203.6	0	0.000	0	0.000
	B		0	0.000	2	0.059
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	2	0.059
Mean			0.00	0.000	0.50	0.015
1515	A	802.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2300	A	802.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	2	0.059
Daily Mean			0.00	0.000	0.17	0.005

NALCO ENVIRONMENTAL SCIENCES

Table C-116. Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 2 and 3 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1515	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0700	A	1366.4	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		1	0.010	0	0.000
	D		0	0.000	0	0.000
Total			1	0.010	0	0.000
Mean			0.25	0.002	0.00	0.000
Daily Total			1	0.010	0	0.000
Daily Mean			0.08	0.0008	0.00	0.000

Table C-117 Number and number/m³ of slimy sculpin (*Cottus cognatus*) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 6 and 7 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1445	A	1165.8	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2315	A	783.5	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0715	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-118 Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 10 and 11 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1445	A	1567.0	0	0.000	1	0.008
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.008
Mean			0.00	0.000	0.25	0.002
2330	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1567.0	0	0.000	1	0.006
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	1	0.006
Mean			0.00	0.000	0.25	0.002
Daily Total			0	0.000	2	0.014
Daily Mean			0.00	0.000	0.17	0.001

NALCO ENVIRONMENTAL SCIENCES

Table C-119. Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 14 and 15 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0700	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-120 Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 18 and 19 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2330	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0730	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-121. Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 22 and 23 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1600	A	1385.3	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A	1184.7	1	0.005	0	0.000
	B		0	0.000	0	0.000
	C		1	0.007	0	0.000
	D		2	0.013	0	0.000
Total			4	0.025	0	0.000
Mean			1.00	0.006	0.00	0.000
0630	A	1184.7	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			4	0.025	0	0.000
Daily Mean			0.33	0.002	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-122 Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 26 and 27 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1530	A	984.1	1	0.010	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			1	0.010	0	0.000
Mean			0.25	0.002	0.00	0.000
2330	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0745	A	984.1	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			1	0.010	0	0.000
Daily Mean			0.08	0.0008	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-123. Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No. /m ³	No.	No. /m ³
1500	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0745	A	1567.0	0	0.000	0	0.000
	B		0	0.000	0	0.000
	C		0	0.000	0	0.000
	D		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

NALCO ENVIRONMENTAL SCIENCES

Table C-124. Number and number/m³ of slimy sculpin (Cottus cognatus) eggs and larvae collected by plankton net at Dean H. Mitchell Station, 30 and 31 July 1975, intake only.

Time	Replicate	Intake Flow m ³ /min	Eggs		Larvae	
			No.	No./m ³	No.	No./m ³
1500	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
2345	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
0745	A ^a	1567.0	0	0.000	0	0.000
	B ^a		0	0.000	0	0.000
	C ^a		0	0.000	0	0.000
	D ^a		0	0.000	0	0.000
Total			0	0.000	0	0.000
Mean			0.00	0.000	0.00	0.000
Daily Total			0	0.000	0	0.000
Daily Mean			0.00	0.000	0.00	0.000

^a These replicates taken from intake canal.